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ABSTRACT

The purpose of this report is to provide a detailed description of the instruments and data used in the Sustaining Effects Study, a large study of the nature, quantity, environment, generality, and sustained effects of compensatory education on basic skills. Each instrument is introduced, the items comprising it are described in detail, and, to give some indication of the types of information provided by the instruments, statistical data obtained from each item are given. The instruments are presented in logical groupings of measures with similar content. Part I details the student-level measures, including achievement tests and descriptive questionnaires. Part II presents the teacher-level measures that describe both teacher and classroom program characteristics. Part III deals with the instruments that describe characteristics of principals and other school-level characteristics. Finally, part IV discusses district-level measures, dealing with both general district characteristics and Title I program characteristics. Together, these instruments provide an extensive amount of information concerning the characteristics of and participants in regular, other compensatory, and Title I programs, and the context within which these programs operate. A great portion of this document consists of statistical tables. (KH)

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REPORT # 9:
THE MEASURES AND VARIABLES IN THE SUSTAINING EFFECTS STUDY

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TECHNICAL REPORT # 9 FROM THE STUDY OF THE SUSTAINING EFFECTS OF COMPENSATORY EDUCATION ON BASIC SKILLS

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2. Breglio, Vincent J.; Hinckley, Ronald H.; and Beal, Richard S. Students' Economic and Educational Status and Selection for Compensatory Education. Decima Research, Santa Ana, California, January 1978.

3. Hinckley, Ronald H.; Beal, Richard S.; and Breglio, Vincent J. Student Economic and Educational Status and Receipt of Educational Services. Decima Research, Santa Ana, California, June 1978.

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5. Wang, Ming-mei; Hoepfner, Ralph; Zagorski, Henry; Hemenway, Judith A.; Brown, Deborah S.; and Bear, Moraye B. The Nature and Recipients of Compensatory Education. System Development Corporation, Santa Monica, California, September 1978.

6. Haggart, Sue A.; Klibanoff, Leonard S.; Sumner, Gerald C.; Williams, Richards S. Resource Analysis of Compensatory Education. RMC Research Corporation, Santa Monica, California, October 1978.

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A PRECIS OF THE SUSTAINING EFFECTS STUDY AND AN OVERVIEW OF THE PRESENT VOLUME

The Sustaining Effects Study

In response to questions about education policies, SDC has studied compensatory education (CE); its nature, quantity, and environment; its sustained effects; and its generality, in a large study called: The Sustaining Effects Study. This thorough study will result in a series of reports from the following substudies:

The Longitudinal Study. In the Longitudinal Study, the educational achievements of children will be assessed in the fall and spring for three consecutive years. The children will take an achievement test in reading and mathematics, a functional literacy test, and a measure of attitude toward school and toward themselves as students. The amount and nature of instruction in reading and mathematics will be determined for each student four times during the school year. In addition, teachers and principals will report on their practices of instruction and teaching. Thus, it will be possible not only to assess student growth over a three-year period, but to relate this growth to the kinds and amounts of instruction being received.

The schools in the study were drawn from three different groups. The **Representative Sample** of schools is a sample carefully drawn to represent all of the nation's public schools having some of the grades one through six. A second group of schools, the **Comparison Sample,** is composed of schools that have large proportions of students from poor homes but do not receive special funds to offer CE services. The third group is the **Nominated Sample,** composed of schools nominated because their educational programs had promise of being effective for low-achieving students. During the first year of the study, data were collected from 328 schools and about 118,000 students.

The Cost/Effectiveness Study. Information is being obtained on the resources and services to which each student is exposed during reading and mathematics instruction. Cost estimates will be generated on the basis of this information. Because the effectiveness of the instructional programs is to be determined in the Longitudinal Study, it will then be possible to relate the effectiveness to the cost of each program.

The Participation Study. The purpose of the Participation Study, is to determine the relationships among economic status, educational need, and instructional services received. The educational achievement of the students and the services they receive will be obtained in the Longitudinal Study, but the refined measures of economic status will be obtained in the Participation Study. A random sample of over 15,000 students will be drawn from the schools in the first-year **Representative Sample** and visits were made to the homes of these students. During the visits, information was collected on the economic level of the home and on the parents' attitudes toward their child's school and learning experiences. Thus, the level of student achievement and services can be related to the economic level of the home from which the student comes.

The Summer Study. The Sustaining Effects Study also examines the effectiveness and cost effectiveness of summer-school programs. RMC Research, responsible for conducting the summer study, is investigating questions about summer school. Information about the 1977 summer school experiences of the SES students is being combined with other SES data. The resource cost model, developed for the regular-year cost-effectiveness studies, is being adapted to the needs of the summer school study.

The Successful Sites Study. This study is to identify and describe the instructional practices and contexts that appear to be effective in raising the reading and math achievements of educationally disadvantaged students. In-depth observational and interview data will be collected from approximately 50 schools that are participating in the Sustaining Effects Study.

OVERVIEW OF THE PRESENT VOLUME

This report is the ninth in the series of Technical Reports from the Sustaining Effects Study. The report and its supplementary volume document the instruments in the longitudinal studies and provide response and scale characteristics that will aid in the technical understanding of analyses to be reported later. In addition, it is hoped that this report will be of benefit to designers of future studies and instruments. The more interesting findings are briefly mentioned below.

ACADEMIC ACHIEVEMENT

Achievements in reading and math, the basic outcomes of education to be studied, were assessed by the Comprehensive Tests of Basic Skills (CTBS). The CTBS were selected after lengthy studies and consultations with experts on a wide variety of alternatives. The tests were then subjected to a multi-phase process for the identification and elimination of items thought to be ethnically or culturally biased. Fall and spring percentile norms and vertical-scale norms were developed from the nationally projected test-score data. A test of the adequacy of the vertical scale indicated that for purposes of group analyses the scale would provide a good basis for comparing means when different test levels are involved. Several approaches revealed that the CTBS scores are sufficiently reliable for use in later complex analyses.

Although subtests within the reading and math tests are highly correlated, the reading and math scores are correlated one with the other at a level low enough (.45 to .77) so they can be considered as different outcomes for analytic purposes. The CTBS scores are substantially correlated with scores on the Practical Achievement Scale (see next paragraph), but were negligibly correlated with attitude scores. Scores were also found to be negatively correlated with indices of majority status and economic status, but positively related to parent educational levels. Differences in scores between subgroups of students were largely found to be not affected by different test levels. Students selected to receive compensatory-education services have lower average CTBS scores than those not selected. Among those selected, Title I students have the lowest means. These findings show that, in general, compensatory programs serve the low-achieving students.

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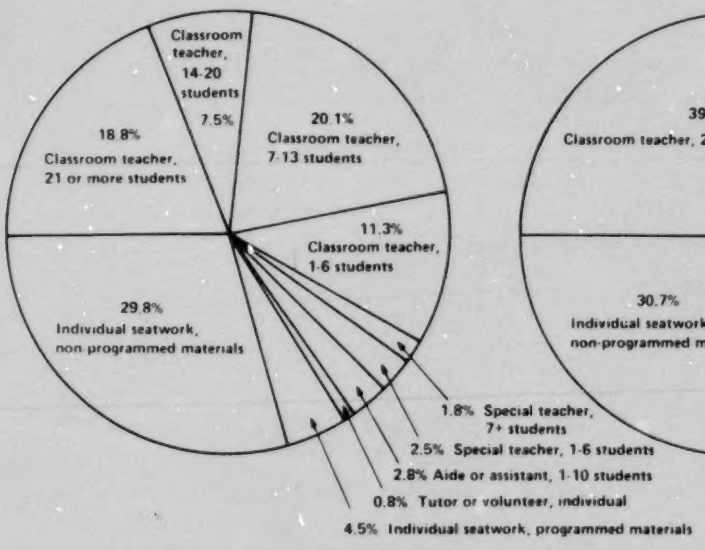
compensatory services than math services, but many receive both. Title I serves more of the compensatory students than any other compensatory program. Percentages of students served by various compensatory-education sources are shown for reading and math services below.

Prorated estimates of per-pupil expenditures were calculated from data on the Compensatory Education Roster and the District Expenditure Questionnaire. The estimates for three funding sources and three activities are illustrated in the graphs below.

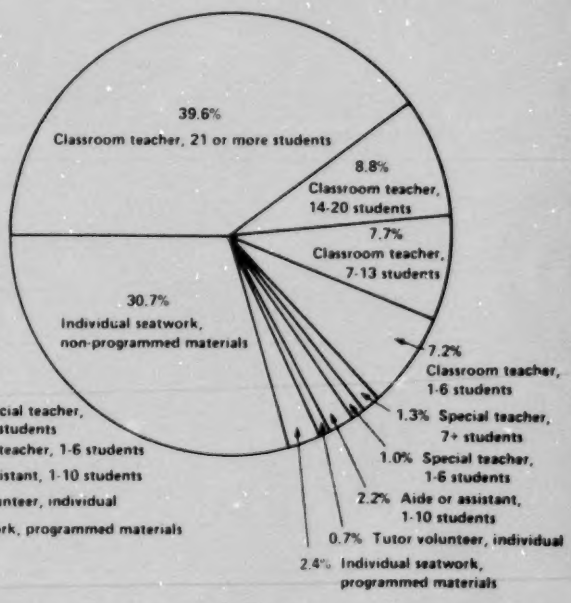
	Title I	Other Federal	District/State
Reading Services	$340	$191	$203
Math Services	$233	$153	$143
Community Activities	$ 23	$ 76	$ 12

The Student Participation and Attendance Record, completed four times a year for each student, monitors the number of hours of instruction received, the types of staff who instruct, and the sizes of the instructional groups. Total hours of reading and math instruction per week decreases with increasing grade. Most instruction in today's schools occurs in small groups and whole classes by the regular teacher, and in the individual seatwork, as shown in the figures below.

Average Configuration of Instructional Services for Reading


Classroom teacher, 14-20 students
7.5%
20.1% Classroom teacher, 7-13 students
18.8% Classroom teacher, 21 or more students
11.3% Classroom teacher, 1-6 students
29.8% Individual seatwork, non-programmed materials
1.8% Special teacher, 7+ students
2.5% Special teacher, 1-6 students
2.8% Aide or assistant, 1-10 students
0.8% Tutor or volunteer, individual
4.5% Individual seatwork, programmed materials

Average Configuration of Instructional Services for Math


39.6% Classroom teacher, 21 or more students
8.8% Classroom teacher, 14-20 students
7.7% Classroom teacher, 7-13 students
30.7% Individual seatwork, non-programmed materials
7.2% Classroom teacher, 1-6 students
1.3% Special teacher, 7+ students
1.0% Special teacher, 1-6 students
2.2% Aide or assistant, 1-10 students
0.7% Tutor volunteer, individual
2.4% Individual seatwork, programmed materials

FUNCTIONAL LITERACY

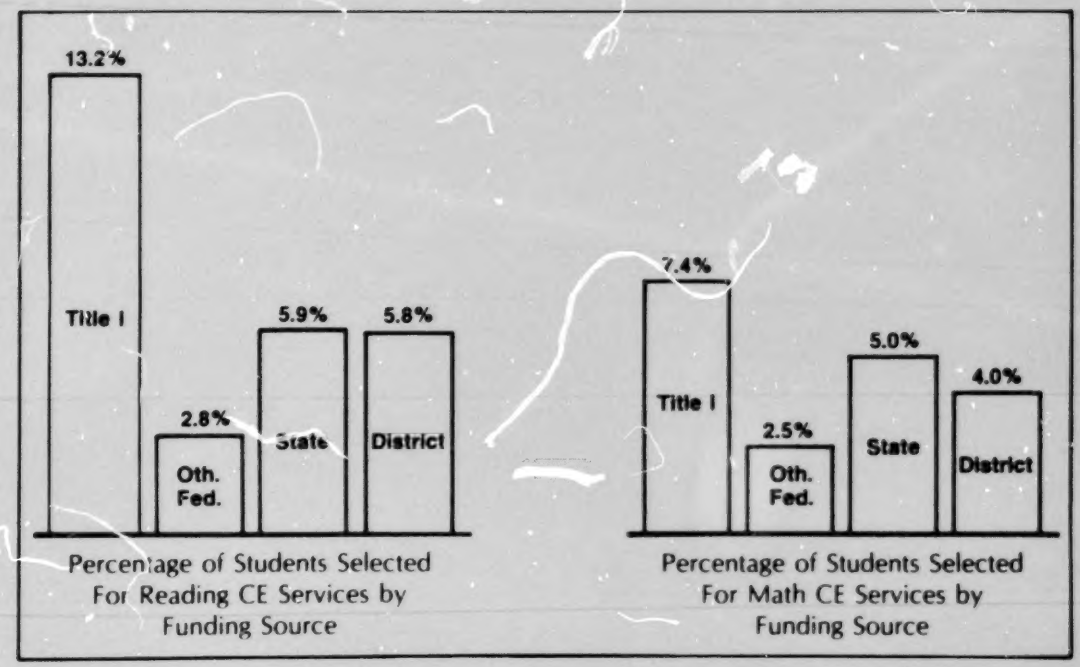
The Practical Achievement Scale was developed as a supplemental measure of student growth in reading and math that would be more relevant to the lives of poor and minority children by presenting real-life pictures accompanied by practical questions that could be answered largely on the basis of the information present in the pictures. Scores showed high internal-consistency and test-retest reliabilities and showed significant increases over grades 4 to 6.

STUDENT ATTITUDES

The Student Affective Measures are scales designed to assess attitudes toward reading, math, and school in general. A primary form was developed for grades 1 to 3 and an intermediate form for grades 4 to 6. The scores have high internal-consistency reliability, but only low-to-moderate test-retest reliability. The three scales are so highly intercorrelated relative to their reliabilities that they should not be assumed to be measuring different attitudes in later analyses employing them. Mean scores decrease over the grades, indicating either worsening attitudes or decreasing positive response biases.

EDUCATIONAL SERVICES AND PROGRAMS

Information on which students were selected to receive which kind of compensatory services was obtained from the Compensatory Education Roster. About one-fourth of the students in grades 1-6 are projected to receive compensatory services. More students receive reading



Percentage of Students Selected For Reading CE Services by Funding Source

Percentage of Students Selected For Math CE Services by Funding Source

From the Student-Teacher Linkage Roster, it was learned that the vast majority of students receive all their reading instruction from one teacher (about 84%) and all their math instruction from one teacher (about 91%). For about 55 percent of the students, the the teacher in reading and the teacher in math is the same person, but this is less common in the higher elementary grades.

PREVIOUS SCHOOL EXPERIENCES AND BACKGROUND

The Summer Activities Slipsheet obtains information about each student's intellectual experiences over the summer months. Knowledge of these experiences should sharpen the analyses of growth during the school year. About ten percent of the students in grades 2-6 attended summer school, but about 67 percent engaged in no structured opportunities for learning during the summer. The average number of comic books read during the summer is about 6, and the average number of other books read is about 5.

Information on each student's demographic characteristics, parents' involvements in education, and the educational environment of his/her school was collected in the Student Background Checklist. Eighty-nine percent of the students had some formal early-childhood educational experience. More than half of the students' parents have met with the teachers and attended a scheduled school event. The teachers report, further, that 6.7 percent of the students come from homes where English is not spoken, and 11 percent of the students have physical, psychological, or adjustment problems that interfere with academic performance (the validity of these teacher judgments is open to question, however).

TEACHER CHARACTERISTICS AND ACTIVITIES

Characteristics of teachers were assessed with the first part of a Teacher Questionnaire. From the questionnaires we learn that almost all elementary teachers have at least a bachelor's degree and report having recently taken college courses or receiving inservice training to improve their skills. From their responses, teachers claim to work a full 8-hour day, not counting some additional time for meetings and school social functions. The teachers felt the most important factors in student academic performance to be student motivation, home environment, and quality of instruction, and the least important to be the income level of a student's family.

INSTRUCTION IN READING AND MATH

From the Teacher Questionnaires we can infer that most elementary students receive reading and math instruction every day, with more time devoted per day, smaller class sizes, more instructional sub-groups, and more individualization in the reading instruction. Teachers all report spending more time on preparing their reading instruction than their math instruction. Instruction for low-achieving students more often is based on individual learner needs, focuses on more basic skills, and requires less homework than instruction for regular-achieving students.

PRINCIPAL CHARACTERISTICS AND ACTIVITIES

Like teachers, principals spend more of their (instructional-leadership) time with reading programs than with math programs. Principals agree with teachers that they work together in making most decisions. They generally also have very positive attitudes toward their school's programs and teachers. About 44 percent of the principals report that they visit classrooms once a week or more often.

SCHOOL CHARACTERISTICS

Teachers believe that the selection of instructional materials and course planning are activities in which the participation of teachers is most important. Few teachers are dissatisfied with the way most decisions are made at their schools. Most describe their principals as very supportive of their work, and their schools as good places to work. Teachers report that the regular and compensatory programs at their schools are coordinated, either by the regular teachers' trying to be aware of progress in the compensatory program, or because the two programs are combined. Teachers are most frequently assigned to teach in compensatory programs on the basis of specialized training.

Most students receive about 5 1/2 hours of instruction per day. Few schools have half-day sessions and most are in session about 180 days. The most common reason for busing students is the distance they live from school. In over 80 percent of the schools, there is some 'pull-out' instruction for compensatory students. The most common ways of determining student participation in compensatory programs is through test results and teacher judgment. When students are participating in compensatory activities, their non-participating peers are engaged in similar activities, i.e., other reading or math instruction.

In over 82 percent of the schools, less than half the students' families are represented at meetings of the PTA or PTO. Most schools communicate student progress to parents in several different ways and promote parental involvement with a variety of techniques. Most inservice training is offered to more staff in reading than in math. Most schools pay their teachers for inservice training, whether on their own or on released time.

DISTRICT CHARACTERISTICS

From the district instruments we learned that about 5 percent of the total district staff is administrative and that about 87 percent of the districts test students in each elementary grade at least once a year. In terms of control over educational practices, the majority of districts promote favored approaches to instruction, select basic textbooks, allocate funds for materials and personnel, decide on teacher hiring, evaluate principals and teachers annually or more often, and use the evaluations for working to improve staff performance. Districts report that over 82 percent of their schools emphasize instructional approaches that concentrate on basic skills.

Only about 2 percent of the nation's school districts have never participated in Title I; the majority of districts began participating during the first year of the program and have continued to participate ever since.

TITLE I PROGRAM CHARACTERISTICS

Ninety-four percent of the districts with elementary schools participated in Title I during the 1976–77 school year. The most common means used to determine the eligibility of the district's schools is through counts of students who receive free or reduced-price lunches, and the most common school allocation method is to allocate funds proportional to the number of low-achieving students. The selection of students is typically based on scores of standardized achievement tests, often in combination with teacher judgment. When other CE funds are received by districts, they are most frequently used to provide compensatory services to students not receiving Title I services.

The person responsible for the administration of the district Title I program devotes about half-time to Title I program activities. Most Title I districts regularly schedule formal meetings of their Parent Advisory Councils in which program planning, needs assessment, and evaluation are discussed.

Title I services are available to students in non-public schools in 54 percent of the Title I districts. These services are provided during normal school hours at the non-public schools, and emphasize reading and math instruction.

INTRODUCTION

PURPOSE OF REPORT # 9

The purpose of this report is to provide a detailed description of the instruments and data used in the Sustaining Effects Study. These instruments can be organized into a number of categories: (1) student-level instruments (both tests and questionnaires), (2) teacher-level instruments (questionnaires only), (3) school-level instruments (questionnaires only), and (4) district-level instruments (questionnaires only). Together, these instruments provide an extensive amount of information concerning the characteristics of and participants in regular, other compensatory, and Title I programs, and the context within which these programs operate. This wealth of information is being used in the Sustaining Effects Study in a variety of ways: (1) to describe the programs and their participants, (2) to explore the relationships among various program, participant, and context characteristics, and (3) to determine the impact of the programs on their participants.

Although the primary focus of this report is to describe the instruments used, such a description would not be complete without some indication of the types of information provided by those instruments. Thus, the format chosen for this report presents a general introduction to each instrument, a detailed description of the items comprising that instrument, and statistics describing the information obtained from each item. Reduced-size copies of the instruments as they were used are provided in a separately bound appendix to this report (Technical Report #9A).

THE INSTRUMENTS AND DATA COLLECTION PROCEDURES

Data collection for the Sustaining Effects Study spans a period of three years, from the fall of 1976 to the spring of 1979. The instruments used remained basically the same over the three years, with the exception that data that were expected to remain the same (e.g., student's racial-ethnic background), or to change in predictable ways (e.g., student's age), were obtained only once during the first year of data collection. Thus, the instruments used during the first year are the most complete in terms of the types of information contained in them. For this reason, most of the data included in this report are from the first-year instruments, unless specified otherwise.

Table 1 lists the instruments used during the first year of data collection, and indicates whom the instruments were intended to describe, who completed the instruments, how many times per year the instruments were administered, and when they were administered.

The actual collection of the data was accomplished by individuals within the sample schools, rather than by SDC employees. In order to do this, one individual from each school was selected as the school coordinator. These coordinators received extensive training from the SDC staff to familiarize them with the nature and purpose of the study, and the data collection procedures that would be used. After this training, the coordinators and SDC staff communicated as needed by means of mail and telephone to coordinate the data collection. At

Table 1

The Instruments Used in the Sustaining Effects Study, Who and/or What They Describe, Who Completes Them, the Number of Administrations Per Year, and the Months of Administration

Instrument Name	Describes	Completed by	Times Per Year	Months* Administered
Compensatory Education Roster	Student	School Coordinator	1	March
Comprehensive Tests of Basic Skills	Student	Student	2	Sept/Oct Apr/May
District Characteristics Questionnaire, Section A	District	Superintendent	1	February
District Characteristics Questionnaire, Section B	Title I Program	Superintendent	1	February
District Expenditure Information Questionnaire	District/School	Business Manager	1	February
Practical Achievement Scale	Student	Student	2	Sept/Oct Apr/May
Principal Questionnaire, Section A	Principal/School	Principal	1	February
Principal Questionnaire, Section B	School	Principal	1	February
Student Affective Measures	Student	Student	2	Sept/Oct Apr/May
Student Background Checklist	Student	Homeroom Teacher	1	March
Student-Teacher Linkage Roster	Student/Teacher	School Coordinator	2	Nov March
Student Participation and Attendance Record	Student	Homeroom Teacher	4	Nov Jan Mar May
Summer Activity Slipsheet	Student	Student	1	Sept/Oct
Teacher Questionnaire, Section A	Teacher/School	Teacher	1	February
Teacher Questionnaire, Section B	Reading Program	Teacher	1	
Teacher Questionnaire, Section C	Math Program	Teacher	1	February

*Months are the recommended times for instrument administration. For student measures, these times are fairly accurate, but for instruments describing teachers, programs, principals, schools, and districts they are merely recommended times.

the appropriate times, packages of instruments were mailed to the school coordinators, who then oversaw the distribution and administration of the instruments. As the instruments were completed, the coordinator gathered them together and mailed them to SDC for processing. These procedures were carefully designed to ensure the anonymity of the respondents, and to ensure that the data collection would be as efficient and accurate as possible.

PROCESSING AND SCORING THE DATA

Upon their return to SDC, the completed instruments were subjected to a series of checks and procedures to transfer the data from the instrument booklets to computer-processable data files. Some of the instruments (most notably the District Expenditure Questionnaire) were reviewed manually to ensure complete data before being further processed. Most of the booklets were then processed by an optical scanning machine which transferred all the information to computer tapes. Computer programs were written to process these tapes in order to check for missing data, duplications, and other errors. Specifications were developed for each instrument to delineate how missing data would be handled, and how each item would be scored. In general, missing data were handled in one of two ways: either the missing information was accepted and coded as missing or, where reasonable, school mean or modal responses were substituted.

Scoring procedures varied widely, depending upon the instrument in question. For the student achievement tests (e.g., CTBS, Practical Achievement Scale), items were scored right or wrong, and then the sum of correct responses was obtained. For questionnaire items, responses were generally coded as simple nominal or ordinal scales. In some instances, ordinal scales were then rescaled to approximate interval or ratio scales (e.g., in an item describing number of hours of homework assigned per week, the original scale was 1 = none, 2 = about half an hour, 3 = 1 to 2 hours, 4 = 2 to 3 hours, 5 = 3 to 4 hours and 6 = more than 4 hours. This was rescaled so that the values were 0, 0.5, 1.5, 2.5, 3.5, and 4.5).

Because of the enormous number of items in the instruments, and because of the usual difficulties with the low reliability of individual items, it was desirable to condense the information as much as possible by combining sets of items into scales or composite variables. These composites are described in this report, in addition to the individual items. In general, the composites were developed on the basis of logical and/or statistical inter-item relationships. The composites described in this report will frequently be used as independent variables in later reports.

THE SAMPLES USED IN THIS REPORT

Report #1 describes in detail the sampling procedures that were used to obtain the sample of schools for the Sustaining Effects Study (SES). Essentially, these procedures involved selecting an initial representative sample of 5,035 schools, of which 5,010 responded to a preliminary survey questionnaire. Of these 5,010 schools, 4,750 were considered eligible to be selected as a part of the SES. From this group of eligible schools, 328 were selected to participate in the SES. These 328 schools can be divided into four different types of samples:

- Representative Sample: 242 schools that were randomly selected to represent the entire nation.

- Feeder Schools: 14 schools that do not contain the full 1-6 grade span, and which feed into or are fed from 14 schools in the representative and comparison samples which also do not contain the full 1-6 grade span.

- Comparison Sample: 29 schools specifically selected because they have high poverty rates, and low compensatory education funding.

- Nominated Sample: 43 schools specifically selected to exemplify promising approaches to the education of disadvantaged students.

In order to keep this report as simple and general as possible, all of the data presented here are from the representative sample. In most instances, this permits the projection of data from the sample to the national population, using appropriate weighting procedures. However, in two instances, such projections were not possible:

(1) Teacher-level data. The sampling ratios for teachers cannot accurately be determined, and thus no projections can be made to the population.

(2) Sub-group data. Sampling ratios are appropriate only for projecting the entire sample to the entire population, not for projecting nonrandom subsets of the sample. Thus, in any instance where the item in question was appropriate for only a subset of the sample (e.g., an item which asks about Title I expenditures is not appropriate for schools that do not participate in Title I), projections to the national population cannot be calculated.

Brief descriptions of the components of the representative sample used in this report are provided below.

Districts. 219 districts in all but six states are in the sample. The districts range in size from 55 to over one million students and have from one to 531 schools. Five of the districts do not participate in Title I.

Schools. A total of 242 schools are in the sample, ranging in size from an enrollment of 25 to one of 1,680, with a median enrollment of 385 students. The schools cover a vast array of grade spans, having from one grade only to the complete span of K-12.

Teachers. Information used in this report comes from 3,578 teachers in the 242 schools. The teachers range widely in their experience and qualifications, and in the subjects and types of students they instruct.

Students. A sample of 81,450 students, approximately evenly divided among the six elementary grades, are included in the sample. These students do not exhaust all the students in the 242 schools, as students outside the 1-6 range were not included. In addition, some students having an unacceptably small amount of data were deleted.

ORGANIZATION OF THIS REPORT

The instruments are presented here in logical groupings of measures with similar content. Part I (Chapters 1 to 4) details the student-level measures, including both achievement tests, and descriptive questionnaires. Part II (Chapters 5 and 6) presents the teacher-level measures that describes both teacher and classroom program characteristics. Part III (Chapters 7 and 8) present the instruments that describe principal characteristics, and other school-level characteristics. Finally Part IV (Chapters 9 and 10) describes the district-level measures, dealing with both general district characteristics and Title I program characteristics.

PART I. STUDENT-LEVEL MEASURES

CHAPTER 1. MEASURES OF READING AND MATH ACHIEVEMENT

The major objective of the Study of Sustaining Effects (SES) is to evaluate the long-term effectiveness of compensatory education in improving cognitive skills. Accordingly, basic skills achievement scores, specifically in reading and math, are considered among the most important outcome measures in the study. Extensive effort was devoted to search for appropriate tests to be administered to the students in the study. Both criterion-referenced tests (CRTs) and standardized achievement tests were evaluated in terms of their usability.

Due to a growing awareness of the problems associated with standardized achievement tests (primarily in the area of score interpretations and test content), educators have increasingly turned to CRTs as an alternative for assessing performance. In order to ensure a proper selection of achievement measures for the present study, Kosecoff and Fink (1976) examined the suitability of CRTs for a large-scale evaluation study and reviewed the available CRTs to determine if they were appropriate for use in the SES study. Based on practical considerations, they concluded that there was no currently available CRT that fitted the needs of the study. The published CRTs are usually characterized by numerous narrowly defined objectives that require too much time for testing, and they lack information on reliability and validity. Though the scores may be easily interpretable in the context of a specific educational objective, they cannot be meaningfully interpreted in broadly stated objectives, typically adopted in national evaluation studies.

Considerations of the merits of CRTs for the study and the excessive time and work involved if they were to be appropriately implemented led to the decision to employ standardized achievement tests for the assessment of educational growth in the SES. With the assistance of a panel of testing experts, Hoepfner and Christen (1976) analyzed the existing standardized achievement batteries in terms of the major objectives and requirements of the study in order to select an appropriate test to be used.

Ten requirements were set by the Office of Education for the selection of achievement measures:

- The existence of empirically based fall and spring norms
- Coverage of a maximum number of grade levels, with greater emphasis on grades 1 through 6
- The existence of reading (comprehension and vocabulary), and math (concepts and computation) subtests
- An assessment of basic skills rather than a reflection of a specific curriculum
- Convertibility of subtest scores to a common cross-level metric (vertical scale scores)
- Relevance to all students, and an absence of ethnic-group bias
- Adequate representation of minority groups in the standardization sample
- Acceptable test reliability and validity

- Adequate parallel forms
- Ease of administration, scoring and processing.

In addition, the time needed to administer the tests should not exceed four one-hour sessions per student, per administration.

A review of the existing standardized achievement batteries revealed that none of them had all the desired characteristics listed above. Therefore, an instrument that best met the needs of the study had to be selected from among them. The study design was then modified to overcome the difficulties associated with the chosen test. The first step in the selection process was to screen a large collection of tests evaluated by the Center for the Study of Evaluation on the basis of subject-matter appropriateness, norm appropriateness, ease of scoring, and score interpretability (Hoepfner et al, 1976). The surviving tests were reviewed in terms of grade-level appropriateness. The screening procedures were applied to reading and math tests separately, resulting in the selection of four tests for further consideration. Among them, the expert panel on achievement tests recommended that the Comprehensive Tests of Basic Skills (CTBS) and the Stanford Achievement Test (SAT) be given serious consideration. The publishers of these two tests were visited to obtain both technical and marketing information. SDC concluded that the two tests are comparable in meeting the requirements of empirical norms, a common metric scale, and ease of administration, but both had shortcomings for the purposes of the study. Because the CTBS had been more recently revised, and because the publisher had undertaken a debiasing study and could provide the data needed for SDC's own debiasing efforts, it was finally selected. The data collection for the study was then designed in a way to enable us to make up for the inadequacies of the selected test. More explicitly, SDC and USOE decided to create new norms and vertical scale scores for the test with data collected during the first year of the study. The newly established norms and vertical scale scores were to be used for the longitudinal evaluations. The details of the test selection are documented in Hoepfner and Christen (1976), while the characteristics of the CTBS, and the new norms and vertical scale scores are described in subsequent sections of this chapter.

TEST ADMINISTRATIONS OF THE CTBS

The 1974 expanded edition, Form S of the CTBS, was selected to measure each student's academic performance. It represents a revision and expansion of Forms Q and R, published in 1968 and 1969. Form S was standardized on a probability sample of the entire national school population (both public and private) during the 1972-73 school year. As stated in the examiner's manual, the tests are intended for national use by students who have been taught according to various approaches. The tests aim to measure those skills common to all curricula, not necessarily the specific objectives of an individual curriculum. The CTBS therefore fits the global objectives of the SES.

The CTBS batteries comprise seven overlapping levels for grades kindergarten through 12 (K-12). The performances of students on these tests depend on the grade levels at which each skill is introduced to them. On the basis of curricula generally adopted in the nation's schools,

Table 1-1

Subscales of the CTBS Test Administered in the Sustaining Effects Study

Test Level	Skill Area		Number of Items		Number of Item Response Alternatives
			Publisher	Debiased	
LEVEL A	Reading	Letter Sounds	21	21	3
		Sound Matching	28	26	2
		Total	49	47	
	Math		26	26	3
LEVEL B	Reading	Word Recognition II	19	19	4
		Comprehension	24	24	3
		Total	43	43	
	Math	Concepts**	14	14	3
		Computation	32	32	3
		Total	46	46	
LEVEL C	Reading	Vocabulary	33	33	4
		Comprehension: Passages	18	17	4
		Total	51	50	
	Math	Concepts**	12	12	4
		Computation	28	28	4
		Total	40	40	
LEVEL 1	Reading	Vocabulary	40	39	4
		Comprehension	45	44	4
		Total	85	83	
	Math	Concepts**	25	25	4
		Computation	48	48	4
		Total	73	73	
LEVEL 2	Reading	Vocabulary	40	40	4
		Comprehension	45	45	4
		Total	85	85	
	Math	Concepts**	25	25	4
		Computation	48	48	4
		Total	73	73	
LEVEL 3	Reading	Vocabulary	40	38	4
		Comprehension	45	44	4
		Total	85	82	
	Math	Concepts**	25	25	4
		Computation	48	48	4
		Total	73	73	

* Items excluded from the publisher's tests to obtain the debiased scores are: Level A, Sound Matching, items 21 and 26; Level C, Reading Comprehension – Passages, item 1; Level 1, Reading Vocabulary, item 31; Reading Comprehension, item 22; and Level 3, Reading Vocabulary, items 15 and 19; Reading Comprehension, item 22.

** Items of mathematics applications have been deleted from the publisher's Mathematics Concepts and Applications subtests. The deleted items are: Level B, items 12, 13, 15, 17, 19-24; Level C, items 6-12, 18-22, 24; Level 1, items 26-50; Level 2, items 26-50; Level 3, items 26-50.

the publisher has recommended the following grade ranges for each of the six levels used in the SES:

Level A	Grades K.0-1.3
Level B	Grades K.6-1.9
Level C	Grades 1.6-2.9
Level 1	Grades 2.5-4.9
Level 2	Grades 4.5-6.9
Level 3	Grades 6.5-8.9

A major goal of the SES is to assess growth in reading and math skills. Therefore, only appropriate subtests in those two skill areas were selected and administered. For math, items measuring mathematical applications were eliminated. For reading, some subtests in the lower test levels (Levels A, B, and C) were deleted. The contents of the subscales selected for administration in the study are summarized in Table 1-1. All tests consist of multiple-choice items with four alternatives — except in a few cases at the lower test levels. The number of items and number of alternatives for each subtest are also presented in the table.

For many years, educators and program evaluators have been concerned about the appropriateness of using standardized achievement tests to measure the academic performance of minority students. The typical item selection procedures used in constructing achievement test batteries were assumed to result in some ethnic bias, (for example, see Green, 1971). Since the compensatory education (CE) programs to be evaluated involve many students from minority groups, and from families of low socioeconomic status, it would be important to remove possible sociocultural biases in the tests employed in this study. The publisher of the CTBS studied item-total point-biserial correlations among various ethnic groups to eliminate items statistically judged biased. (CTBS/McGraw-Hill, 1974). The tests were also reviewed by members of minority groups who are knowledgeable about how students learn and perform in test situations. In order to remove any potential bias against disadvantaged and minority students — so as to minimize the chances of drawing inappropriate inferences from biased test data — SDC decided to carry out an independent debiasing study with item-level data provided by the publisher.

Two statistical approaches (an analysis-of-variance design with repeated measures and a correlational approach based on the item-total point-biserial correlations) were employed to examine the items in each subtest for possible biases against any ethnic groups. All the items that were identified as being potentially biased with these two approaches were subjected to a judgmental analysis. A panel of ten persons from various ethnic backgrounds was formed to review the content of the statistically biased items, following a modified Delphi approach. The review process led to the identification of a total of eight items as being both statistically and culturally biased (see footnote for Table 1-1). For detailed descriptions of the procedures of the debiasing study, the reader may refer to Hoepfner and Christen (1976).

All eight biased items came from reading subtests; none of the math items was judged to be biased. Instead of deleting the debiased items from the tests, the students were administered the selected subtests in their entirety. Two kinds of scores, debiased and non-debiased, were

then obtained in the scoring process. The non-debiased (publisher's) scores are based on the entire test, while the debiased scores are based on the diminished tests, with biased item(s) omitted from scoring. In this way, the non-debiased scores for which the publisher's norms are available are reported back to schools for their own use. These non-debiased scores are also used in the analyses dealing with policy questions about CE selection, since schools are likely to employ the publisher's tests and norms for their CE selection if tests are used at all. On the other hand, the debiased scores will generally be used for analyses addressing policy questions about the effectiveness of CE. The number of items for the debiased subtests appears in the fourth column of Table 1-1.

One of the requirements for the tests to be employed in the SES is the availability of empirically-based fall and spring norms. Although the publisher supplies percentile norms for both fall (beginning of the school year) and spring (end of the school year), these norms have not been empirically determined. For the standardization of CTBS/S, levels A (for grade K), and B (for Grade 1) were administered in both the fall and spring of the 1972-73 school year. All the other levels were administered to the standardization sample only in the spring of 1973. Thus, most of the publisher's norms were obtained through interpolations. In addition, there were concerns about the recency of the norms and the adequate representation of minority and disadvantaged students in the standardization sample. Also, if norm-referenced analyses are to be a part of the study, norms for the Debiased Tests would be needed. Another problem is that the total reading tests of levels A, B, and C, and the total math tests of all levels except level A, are not identical to the publisher's tests because of the deletion of some reading subtests, and all of the items of math applications, respectively. The reading and math *total scores* are essential to many analyses required to answer the research questions posed by the study. Based on these considerations, the selected tests were restandardized with the new data collected during the first year of the study. The nature of the first-year representative sample (Hoepfner et al, 1977) ensures adequate representation of minority and economically disadvantaged students, and the data collected in this sample enabled us empirically to establish norms that are recent and appropriate for the population of interest, the nation's students in the public elementary schools.

Likewise, a common cross-level metric scale (vertical scale) had to be created specifically for use in the longitudinal evaluation because there are no corresponding scales available from the publisher for the selected reading and math tests. A test plan was developed to meet the data needs of the restandardization work on creating new norms and vertical scales. A double-testing procedure was adopted so that norms based on two different test levels can be determined empirically for each grade. This procedure also provides a good data base for the purpose of articulating the test levels to calibrate a vertical scale for the tests in each skill area. More important, because scale scores based on two adjacent test levels are obtained for each student, these data will allow us to investigate the validity of the resulting vertical scales.

The test plan calls for administrations of an at-level (grade-appropriate level) test and a below-level (a level immediately below the grade-appropriate level) test to each student. The grade-appropriate level is determined on the basis of the publisher's recommendation and the item-analysis data available from the publisher's standardization. Table 1-2 presents the at-

and below-level tests administered for each grade during the first year of data collection. The test administrations were scheduled to take place during the third and fourth weeks of the 1976-77 school year, and the fifth and fourth weeks prior to the closing of the school year. In general, the schedule indicates that the tests were normally given between the end of September and early October in the fall, and between the end of April and early May in the spring, depending on the school's opening and closing dates. The time required for the testing ranges from a total of 67 minutes to 107 minutes for levels A, and 1, respectively.

Table 1-2

Test Levels of CTBS Administered in the First Study Year

Grade	Fall Administration		Spring Administration	
	Below-Level	At-Level	Below-Level	At-Level
1	A	B	B	C
2	B	C	C	1
3	C	1	C	1
4	1	2	1	2
5	1	2	1	2
6	2	3	2	3

A major problem of such a double-testing policy is the determination of the order in which the tests should be given. Test-order effects may arise due to learning, fatigue, boredom, and situational factors. Field test data were collected during the 1975-76 planning year of the SES and analyzed to determine if any effects of test order exist and, if so, what order should be followed to minimize the impact of such effects. The results of the data analyses were less than conclusive. As documented in Hoepfner and Christen (1976), each of the three strategies (counter-balanced order, at-level-first order, and below-level-first order) has both advantages and disadvantages. Taking into consideration the logistics of test administration and the effects that a difficult test might have on test-taking attitudes of low-achieving students, it was decided to test in a constant below-then-at order. The below-level reading and math tests were given during the first week of testing, whereas the at-level tests were given in the second week.

The test plan requires the students to take at least one test level that is the same in both fall and spring. In the longitudinal study of the SES, tests are administered twice a year to the same group of students over a period of three years. Counting the double testing in the first year, this study design results in a total of eight CTBS testings for each student. With six overlapping levels that span from grades K to 8, it is necessarily the case that students have to take some level of tests more than once. In such repetitive testing situations, alternate forms of the tests are frequently utilized to avoid practice effects. However, since the alternate-form reliabilities tend to be lower than test-retest reliabilities and the alternate forms of standarized achievement tests are often not very comparable in content and difficulty, the SES panel on achievement tests recommended that alternate forms of the test not be employed. Therefore, only Form S of the CTBS has been used throughout the study.

With the completion of the restandardization work in the first year, double-testing was not needed in the subsequent years. The primary concern for the test plan then becomes the level

of tests to be administered for each grade. In the past decade, individualized testing (testing at student's functional level) has received much attention. Clearly, it is impractical to implement such a testing policy in a large-scale evaluation study like the SES. Nevertheless, it is important that test levels be carefully selected so that they are neither too easy nor too difficult for the majority of the students. In particular, a suitable test for a group of examinees should be one that is free from ceiling and floor effects. In order to determine an appropriate level of the CTBS for each grade in each school in subsequent study years, test scores of the two levels administered in the first year were examined. The test level that yielded less extreme scores (scores that are below the chance level and scores that are perfect or near perfect) for the group of students was recommended for use in the later years for each grade at each school. The fall and spring test data were separately used to obtain the level indices for the fall and spring administrations for each skill area/grade/school combination. To reduce the logistics problems in the test distribution, the same test level was recommended for reading and math. In cases where there was a discrepancy between the levels selected for the two skill areas, one level was chosen for both skills by considering the extent of extreme scores obtained with each of the two levels in the two skill areas jointly. These level indices were developed and incorporated into the SES database so that appropriate conversions from raw scores to percentile ranks and vertical scale scores could be made to provide data for the longitudinal analyses.

DEVELOPMENT OF PERCENTILE NORMS AND SCALE SCORES

The database for the SES standardization of the CTBS consists of the test data collected in the first-year representative sample during the 1976-77 school year. Two levels of CTBS were administered twice, fall and spring, to more than 80,000 students enrolled in grades 1 through 6 at each of the 242 representative schools. Complete data for a student is comprised of scores for reading and math for two adjacent test levels in each test administration. Because of missing data, not all students in the sample contributed complete data for the standardization. The number of students who provided the required test data varies by grade and test, ranging from nearly 12,000 per test for grade 4 to more than 14,000 per test for grade 6.

The first year representative sample was selected from the nation's 62,534 public schools that operate at least one grade in the 1-6 range. The sampling scheme uses three stratifying dimensions: geographic region (10 regions), size (3 categories), and poverty level (3 levels) of the schools' associated districts. Six of the possible 90 sampling cells contain no schools, leaving 84 occupied cells. An initial sample of 5,035 schools was selected by random sampling within strata. A principal survey was conducted in these schools to determine whether the schools could supply useful data for the SES. The results of the survey reduced the eligible sample pool to a total of 4,750 respondent schools. From this pool, two to five (typically three) schools were randomly selected in each of the 84 non-empty sampling cells. Some initially sampled schools refused to participate and were replaced by comparable schools in the same cell, where possible. This sampling procedure yielded a final sample of 243 schools. One school was later dropped from the study because it failed to return data after many attempts by the SES data collection staff to obtain cooperation. Detailed descriptions of the selection and the characteristics of the sample may be found in Report # 1 of the SES Report Series (Hoepfner et al., 1977). The sample was designed with a deliberate effort

to ensure that minority and economically disadvantaged students be adequately represented. This, and the large sample size, should have enabled us to establish accurate national norms.

Appropriate sampling weights were developed on the basis of enrollment data from the 1970 census and the SES principal survey during the 1975-76 planning year. The 1975 Market Data Retrieval (MDR) data tapes contain total school enrollments that include grades 1-6 and others. To obtain an estimate of the grade 1-6 enrollment in a school, the total enrollment was prorated in terms of its grade span. The prorated estimates for the schools in a sampling cell were summed to provide an initial estimate of the population grade 1-6 enrollment in that cell. These estimates were presented in Table IV-17 of Report # 1 (Hoepfner et al., 1977). Because enrollments by grade were reported by the principals of the 4,750 respondent schools, the data may be compiled to obtain the actual grade 1-6 enrollments in these schools. Moreover, the enrollment figures reported by the principals pertain to the 1975-76 school year and thus are more up-to-date than the MDR figures. For these reasons, the principals' data were used to adjust the MDR estimates of the grade 1-6 enrollment in each cell. Within each sampling cell, the ratio of the total grade 1-6 enrollments for the respondent schools in the cell to the corresponding estimates as obtained from prorating the MDR data was calculated and employed as an adjustment factor. The initial MDR estimate of the population grade 1-6 enrollment for each cell was multiplied by the adjustment factor to yield a new enrollment estimate.

In order to obtain enrollment estimates by grade for each sampling cell, the distribution of the total grade 1-6 enrollment in the 4,750 schools over the six grades was examined. The proportion of student enrollment in each of the six grades was derived from the principals' data by dividing the total enrollment in these schools for each grade by the sum of their enrollments in grades 1-6. The adjusted estimate of the population grade 1-6 enrollment for each cell was then distributed to the six grades according to these proportions. Finally, the ratio of the enrollment estimate for each grade in each cell to the number of students sampled and tested in the respective grade in that cell was computed for each of the 84 cells by grade. These estimated sampling ratios constitute the weights that were applied to the observed test data to obtain projected frequency distributions of test scores in the population of interest. In two of the 84 cells none of the sample schools operated grade 6 and thus supplied no data for the sixth graders in these cells. In obtaining the projected score distributions for grade 6, the corresponding score frequencies within these two cells were estimated by data from the neighboring cells. As neither of the two cells is large (accounting for 1.21% and .22%, respectively, of the entire grade 1-6 enrollment in the population), the approximation procedure is not likely to introduce substantial bias into the results. The percentile ranks associated with the raw score were then derived from the nationally projected frequency distributions. Likewise, the equating of the tests across levels was based entirely on these projected data.

Norms and scale scores were developed for reading, math, and basic skills, but not for the subtests within a skill area. In the main study, subtest scores are not to be analyzed. This decision was made partly because of the high correlations between subtest scores within skill areas. Previous analyses with subtest scores in the ESAA Evaluation Study (Coulson et al, 1975) did not yield important differential findings for the sub-scales. The length of the subtests was also of concern. For the creation of scale scores, the small number of items in many

ubtests, particularly in math concepts, and the ambiguity in the assignment of level A subtests o a particular sub-skill area, presented problems for a satisfactory inter-level articulation of he subtests. Therefore, though the same standardization procedure could have been applied o each of the four sub-skill areas (reading vocabulary, reading comprehension, math concepts, and math computation), they have not been carried out.

Because both the debiased and non-debiased scores are used in the SES analyses, five kinds of raw score were dealt with in the standardization operation:

- Math Scores – The debiasing study found no biased items in the math tests, and thus only one raw score is obtained for the math test. MPRS (*M*ath *P*ublisher's *R*aw *S*core) is the acronym for this score.
- Debiased Reading Scores – Scores obtained by deleting the biased items from the publisher's tests. RDBRS (*R*eading *D*e-*B*iased *R*aw *S*core) is the acronym.
- Non-debiased Reading Scores – Scores based on all items in the publisher's tests: RPRS (*R*eading *P*ublisher's *R*aw *S*core) is the acronym.
- Debiased Basic Skills Total Score – Sum of MPRS and RDBRS. The acronym is TDBRS (*T*otal *D*e-*B*iased *R*aw *S*core).
- Non-debiased Basic Skills Total Score – Sum of MPRS and RPRS. The acronym is TPRS (*T*otal *P*ublisher's *R*aw *S*core).

The standardization procedures and results described below apply equally to each of these five scores

Percentile Norms. The projected national frequency distributions of the scores for each grade/test administration/test level combination was smoothed with the weighted moving average method suggested by Cureton and Tukey (1951). The algorithm applies different weights to the frequencies of five consecutive scores and averages them to provide a smoothed estimate of the frequency for the mid-point. The estimated frequency is obtained essentially by fitting a least-squares cubic curve to every five equally-spaced adjacent points and then calculating the fitted value for the mid-point. Having smoothed the frequency curve, the mid-percentile rank for a score x is calculated by adding a half of the estimated frequency for the score x to the cumulative frequency for score x-1, dividing the sum by the projected number of students in the population, and expressing the result as a percentage. These mid-percentile ranks are rounded to two-digit integers to give the percentile scores corresponding to the raw scores. All percentile ranks of less than 1.5 are designated as 1, while all those greater than 98.5 are designated as 99. The results for the fall test administrations are presented in Tables A-1 through A-12 of Appendix A, by test level and grade. Each table contains the raw score to percentile rank conversions for all the five kinds of raw scores employed in the present study. Similar conversion tables for the spring test administrations are presented in Tables A-13 through A-24. The reader may consult Table 1-2 to determine if percentile norms are available for a particular grade/test administration.

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One aspect of concern in the selection of a test level for a group of students is the extent of floor and ceiling effects on measures of performance. To provide some information on the floor effects of the tests on the entire SES population, the percentile ranks associated with the chance-level scores for each of the two adjacent test levels, administered at each grade, are compiled from Tables A-1 through A-24 in Appendix A and presented in Table 1-3. Referring to Table 1-1, the chance scores are obtained by dividing the number of items in each test by the number of alternatives in the multiple-choice items. Inspection of the table reveals that, with the conventional definition, severe floor effects exist for both the reading and math tests of level B if they are administered to the first graders in the fall. For this reason, level A tests were recommended for grade 1 at the fall test administration in the subsequent years of the study.

Table 1-3

Percentile Ranks Associated with the Chance Scores (Based on Non-debiased Scores)

Grade*	Test Level	Reading		Math	
		Chance Score	Percentile Rank	Chance Score	Percentile Rank
1.1	A	21	11	9	4
	B	13	49	15	47
1.8	B	13	7	15	10
	C	13	14	10	13
2.1	B	13	6	15	7
	C	13	11	10	11
2.8	C	13	3	10	2
	1	21	3	18	3
3.1	C	13	2	10	2
	1	21	15	18	11
3.8	C	13	1	10	1
	1	21	6	18	2
4.1	1	21	7	18	3
	2	21	14	18	9
4.8	1	21	2	18	1
	2	21	7	18	3
5.1	1	21	3	18	1
	2	21	7	18	3
5.8	1	21	1	18	1
	2	21	4	18	1
6.1	2	21	4	18	1
	3	21	11	18	15
6.8	2	21	2	18	1
	3	21	6	18	6

*g. 1 indicates fall administration, g. 8 indicates spring administration.

e each student in the standardization sample took two tests of adjacent levels, the data wed us to investigate empirically if a student's achievements, as determined by the two centile scores of the two test levels, are closely in agreement. A sample of 500 students each grade was randomly selected from the database and correlations of the at-level and w-level percentile scores were computed. Correlations obtained on the basis of the iased scores in the fall test administration are given in Table 1-4 for illustrative purposes. eneral, correlations based on percentile scores are similar to the corresponding correla- s based on raw scores. Except for grade 1, the correlations are quite high, mostly in the and 90's.

Table 1-4

Correlations Between the Percentile Ranks as Determined on the Basis of the Debiased At- and Below-Level CTBS Tests[a] Test Administration – Fall, 1976

Grade	Skill Area		
	Reading	Math	Basic Skills
1	.48	.58	.64
2	.82	.78	.86
3	.86	.84	.90
4	.87	.83	.91
5	.92	.84	.94
6	.90	.79	.91

ed on a random sample of 500 for each grade in the representative schools with missing data deleted.

e publisher's standardization was completed 4 years earlier and its sample differs considera- from that of the SES. The publisher's standardization sample always involves different oups of students for different levels of tests. It includes both public and private schools while e SES sample is limited to public schools with grades 1-6. In addition, a major difference tween the two standardizations exists in the test plan. For the test plan the publisher nployed primarily spring test data and relied on interpolations to obtain norms for other time riods. In contrast, interpolations are not required for the SES norms because students were sted at both times. In view of these differences, it is of interest to compare the SES norms d those of the publisher. As explained earlier, most of the reading and math tests adminis- red in the SES do not include all the items of the original CTBS/S tests. Indeed, the SES and blisher's tests are exactly the same only for levels 1, 2, and 3 of the reading tests.

ble 1-5 presents the average absolute differences in percentiles, as well as in Normal Curve uivalent (NCE) units, between the SES and the publisher's norms for all cases where norms e available from both standardizations. The data in the table show that the discrepancies tween the two sets of norms are generally not substantial. The largest discrepancies are und in the spring norms for grade 2 with the level 1 test. Although not presented here, stributions of the signed differences in percentile scores were also examined. The results dicated that for the spring norms, the publisher's percentiles tend to be higher than the SES rcentiles for fixed raw scores, whereas for the fall norms the directions of the differences

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tend to be reversed. The higher percentiles of the publisher's norms imply that the projecte performance level of the SES population in the spring exhibits an upward shift from that o the publisher's population. A possible explanation for the reversed phenomenon in the fa norms is that the publisher's fall norms were obtained by interpolating between the sprin norms of two adjacent grades and therefore may not correspond exactly to the empiric results. As illustrated later in Figure 1-1, the Vertical Scale Score (and thus the raw score corresponding to a given percentile rank in the fall tends to be lower than that obtained b linearly interpolating between the two adjacent spring scores. This means that for a given ra score its percentile rank obtained by interpolation tends to be depressed. Since the publishe did not include fall test administrations of any level 1-3 tests in its standardization, thi conjecture can not be checked.

Table 1-5

Comparisons of the Publisher's and the SES's Percentile Norms for the Reading Tests of Levels 1, 2, and 3

Test Level	Grade	Fall Administrations				Spring Administrations			
		Absolute Differences In				Absolute Difference In			
		Percentiles		NCEs*		Percentiles		NCEs*	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
	2	N/A	N/A	N/A	N/A	6.52	4.84	5.94	3.73
1	3	1.22	1.50	1.38	1.94	3.81	2.77	3.27	2.27
	4	2.17	1.72	1.66	1.35	2.09	1.48	2.12	1.92
	4	1.92	1.92	2.02	1.89	1.73	1.80	1.71	2.17
2	5	.73	.87	.82	1.27	2.03	2.01	1.63	1.46
	6	.88	1.01	.73	.94	3.78	3.02	3.23	2.23
3	6	2.12	1.68	2.14	1.95	2.44	1.98	2.54	2.69

*The Normal Curve Equivalents (NCEs) are obtained by rescaling the normal deviates corresponding to the percentiles to a scale with a standard deviation of 21.06, so that the percentiles of 1, 50, and 99 remain the same in the NCE scale.

Vertical Scale Scores. The double-testing plan was specifically designed to provide data required for inter-level articulation. The initial plan was to apply a linear regression model on normalized test scores to equate the two adjacent test levels given to a grade, since every student will have taken both tests. Thurstone's absolute linear scaling method (Thurstone 1925; Gulliksen, 1950; Angoff, 1971) was applied to link the data of a given test level but from different grades so that scores for the same test level are anchored at the same distribution of that test for a fixed grade. Alternate applications of the regression and the linear scaling procedures lead to the creation of a common metric across the test levels. This common metric is referred to as the Vertical Scale here. A sketch of the equating procedure was presented in Hoepfner and Christen (1976). The procedure differs from the traditional method primarily in that the latter relies on the equi-percentile equating between test levels, and different subsamples within a grade are used to provide data for different test levels. The proposed procedure was applied to the SES test data collected in the fall of 1976. The success

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f using linear regression to equate scores of different test levels within a grade depends eavily on the high correlation between test levels (an indication that the two levels measure e same thing). As shown in Table 1-6, the between-level correlations obtained with normal-ed test scores are not as high as needed, particularly at the lower grades involving lower st levels. Since both at- and below-level scores are subject to measurement errors, the low orrelations (combined with the fact that the regressor variable is always treated as infallible estimating the regression equation) result in considerable regressed-toward-the-mean ef-cts on the predicted scores of one level from those of the other level. Because level 1 was hosen as the anchor test in the equating, the scores of the other levels have all been regressed least once during the equating process. The results indicate that at the two extreme ends f raw scores, the lower end in particular, scale scores in the lower test level do not extend ower and those in the higher test level do not extend higher on the metric. Careful considera-ions of the implication of such results led to a decision of foregoing the linear-regression quating between levels in favor of equi-percentile equating. Thus, the modified procedure the present equating work differs from the conventional practice only in that the present ork utilizes test data from the same examinees and thereby eliminates sources of possible rrors due to non-equivalence between subsamples.

Table 1-6

Intercorrelations Based on Normalized Scores Between the At- and Below-Level Tests for the Fall Administration

Grade	Type of Tests				
	Math	Debiased Reading	Non-Debiased Reading	Debiased Basic Skills	Non-Debiased Basic Skills
1	.59	.43	.43	.62	.61
2	.79	.81	.81	.87	.87
3	.82	.81	.81	.88	.88
4	.78	.86	.86	.88	.88
5	.82	.89	.89	.91	.91
6	.79	.88	.88	.90	.90

n summary, the present procedures for creating a vertical scale for each of the CTBS tests ncluded in the SES testing are outlined below. The procedures were applied to the fall and spring data separately to obtain two independent calibrations of the common metric scale. The two sets of results were then integrated to arrive at a final vertical scale.

- On the basis of the smoothed projected frequency distributions for the test scores, the mid-percentile rank (MPR) associated with each raw score for each test level and each grade was converted to the standard normal deviate by applying the inverse standardized normal function to the MPR. For convenience, the normal deviates are denoted as z_{glj}, where g, l, j are subscripts for grade, test level, and raw score, respectively. A total of 12 sets of normal deviates was thus obtained, one for each grade/test level combination. When the MPRs are almost zero or almost one, the normal deviates become undefined because of the unbounded characteristic of the normal inverse function, and consequently they were treated as missing values in the subsequent

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computations involving them. Preliminary scale scores were not calibrated for them but, in the final vertical scale, scale scores were assigned to their corresponding raw scores through smoothing and extrapolation. For the SES data, these cases occu infrequently.

- The correlations between any two sets of normal deviates for a given test level (bu at different grades) were computed to check on the appropriateness of the linea scaling for equating the sets of normal deviates from different grades but for the same test level. All such correlations were very high, exceeding .995, with a few exceptions in the lower test levels. The lowest correlation was .969, found for level B reading test between grades 1 and 2 in the fall administration.

- The level 1 test for grade 4 was chosen as the anchor test. Since the scale scores are to be placed on an interval scale, two parameters may be arbitrarily set at some convenient values. For the equating with the fall data, a mean of 500 and a standard deviation of 60 for the Vertical Scale Score distribution at grade 4 were used to fix the origin and the unit of the scale. These values were chosen to ensure that the scale scores would not extend below 1 or above 998. The means and standard deviations for other grades were derived with the linear scaling method and used in the equi-percentile equating. Explicitly, the mean and standard deviation of the grade 5 distribution were obtained by linearly mapping z_{5lj} to z_{4lj}. Thus, let μ_{gF} and σ_{gF} stand for the mean and standard deviation for grade g in the fall equating,

$$\text{then} \quad \mu_{5F} = \left(\theta_{41F} - \theta_{51F}\frac{\phi_{41F}}{\phi_{51F}}\right)\sigma_{4F} + \mu_{4F}$$

$$\text{and} \quad \sigma_{5F} = \frac{\phi_{41F}}{\phi_{51F}}\sigma_{4F} ,$$

where θ_{glF} and ϕ_{glF} are the mean and standard deviation of z_{glj}, for given g and l, based on the fall data.

In other words, μ_{5F} and σ_{5F} are approximately equivalent to the mean and standard deviaton of $(\sigma_{4F} \cdot \hat{z}_{5lj} + \mu_{4F})$, where $\hat{z}_{5lj}$ is the regressed estimate of z_{5lj} from z_{4lj}. They are approximate in the sense that a correlation of one (1) was used in the regression estimates, instead of the actual value, which is nearly one (1) anyway. Means and standard deviations for other grades are obtained in a similar fashion successively with a common test level for each pair of adjacent grades, once the parameters for one of the grades have been calculated in a preceding step. In the spring equating, the same procedures were followed except that the mean and standard deviation for grade 4 (μ_{4S} and σ_{4S}) were fixed by linearly mapping the spring normal deviates for level 1 at grade 4 to the corresponding fall normal deviates. That is,

$$\mu_{4S} = \left(\theta_{41F} - \theta_{41S} \cdot \frac{\phi_{41F}}{\phi_{41S}}\right) \cdot 60 + 500 ,$$

$$\text{and} \quad \sigma_{4S} = \frac{\phi_{41F}}{\phi_{41S}} \cdot 60 ,$$

employing the same notations used earlier.

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- Having determined the means and standard deviations required for the inter-level equating, preliminary calculations of Vertical Scale Scores (VSS) were accomplished by first transforming all z_{gij} scores into the normalized scores V_{gij} with the appropriate mean and standard deviation for the given grade g:

$$V_{gij} = z_{gij} \cdot \sigma_g + \mu_g$$

(the subscript for test administration in σ and μ is omitted because this step applies to both cases).

The next step is to average, for given I and j, the V_{gij}'s over all grades that were tested at level I to obtain the unsmoothed VSS:

$$V_{ij} = \sum_{g \epsilon T} V_{gij}/G_I ,$$

where T contains the set of grades at which z_{gij}, and thus V_{gij} were defined for test level i and raw score j, and G_I is the number of grades in the set T.

In passing, it should be noted that although a mean of 500 and a standard deviation of 60 were chosen for the grade 4 distributions for each of the five kinds of test scores (skill areas), the resulting scale scores are not directly comparable among skill areas because score distributions for each grade vary with skill areas.

- Finally, the resulting set of unsmoothed VSSs were smoothed by fitting a polynomial function of the VSS on the raw score for each test level. The orthogonal polynomial regression algorithm was employed to determine the appropriate degree of the function. Examinations of the residuals and the fitted curve revealed that a five-degree function provides satisfactory fit in most cases. The regressed VSSs obtained from the fitted polynomial function constitute the final vertical scale scores.

Thus, two sets of VSSs were calibrated for the CTBS tests by using the fall and spring test data separately. The results enable us to verify if the two scales were linearly related as they should be if the test scores conform to the idea of an underlying common interval-scale across the test levels. Although the correlations between the two resulting scales for each test level separately, and for the six levels combined, all exceed .99, the residual variances obtained by regressing one scale on another were substantial. Further investigations of the relationship between the two sets of unsmoothed scale scores were conducted with principal component analyses. The idea stems from the orthogonal least-squares technique for fitting a set of points that are functionally related (Pearson, 1901; Graybill, 1961; Morrison, 1967). As both sets of scale scores were obtained with similar procedures and test data, neither can be regarded as being more accurate than the other. Since both scales are subject to measurement errors, it was decided to treat them equally in our effort to integrate the two independent results to arrive at a common scale. The orthogonal least-square fit of the best-fitting line for these data leads to a scale that corresponds to the first principal axis of the two variables. In essence, for a two-variable case, the method minimizes the sum of squared distances of each point to its projection on the chosen axis. Since in the process of the two independent equatings, the scales were fixed implicitly to make them commensurable, the covariance form of the principal component analyses was used in obtaining the fit. The proportion of variance accounted for by the first principal axis exceeds .999 in each case for the five kinds of tests.

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This step utilizes only the unsmoothed VSSs obtained in the fall and spring for levels B throug 3, because level A was not included in the spring testing. For these five test levels, the adjuste VSSs (VSSAs) to be obtained by integrating the fall and spring scales were calculated for eac raw score as weighted averages of the fall and spring VSSs (VSSF and VSSS) associated wit the raw score.

$$VSSA = (W_F \cdot VSSF + W_S \cdot VSSS) / (W_F + W_S)$$

The weights W_F and W_S, as given in Table 1-7, are the elements of the eigenvector tha defines the first principal axis.

Table 1-7

Weights for the Fall and Spring Scale Scores, Used to Obtain the Unsmoothed Fall-Spring Coordinated VSS

Type of Tests	Weights Applied	
	Fall VSS	Spring VSS
Math	.7591	.6510
Debiased Reading	.7122	.7019
Non-debiased Reading	.7109	.7033
Debiased Basic Skills	.7298	.6837
Non-debiased Basic Skills	.7242	.6896

The adjusted VSSs were then smoothed employing orthogonal polynomial regression tech niques. The results form the final fall-spring Coordinated Vertical Scale for levels B throug 3. The VSSs for level A tests on this final scale were calibrated on the basis of the fall dat by the following steps:

- Obtain the projected mean and standard deviation in terms of the fall-spring Coor dinated VSSs for the fall administration at grade 1 with Level B test.
- The resulting mean and standard deviation were used to transform the fall z_{IAj}'s into unsmoothed scale scores.
- The scores obtained from the transformation in the preceding step were smoothed by employing orthogonal polynomial regressions to create the VSSs for level A tests on the final scale.

The raw score to VSS conversions are provided in Tables A-25 to A-30 for each of the six test levels, by skill areas.

Because the inter-level correlations are germane to the appropriateness of the equating among the test levels, they are presented in Table 1-8. Since most of the SES analyses employ the debiased scores, only correlations for the debiased tests are given. The correlations for the non-debiased scores are practically identical to those for their corresponding debiased scores. The correlations were computed both with raw scores and VSSs on the basis of the projected

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Table 1-8

Intercorrelations Between At- and Below-Level Debiased CTBS Scores*
(Based on Projected Joint Frequency Distributions for the Population of Students in Public Schools)

Grade	Score Type**	Skill Area					
		Reading		Math		Basic Skills	
		Fall	Spring	Fall	Spring	Fall	Spring
1	RS	.38	.77	.58	.77	.55	.84
	VSS	.44	.78	.59	.78	.62	.85
2	RS	.80	.75	.79	.80	.85	.83
	VSS	.80	.82	.78	.80	.86	.87
3	RS	.75	.75	.81	.80	.84	.83
	VSS	.82	.80	.81	.78	.88	.85
4	RS	.87	.87	.76	.76	.88	.87
	VSS	.86	.88	.78	.81	.88	.90
5	RS	.88	.87	.76	.76	.88	.88
	VSS	.89	.88	.82	.80	.91	.90
6	RS	.87	.87	.75	.81	.88	.89
	VSS	.87	.89	.78	.85	.89	.92

*See Table 1-2 for the test levels administered at each grade.
**RS = Raw Score; VSS = Vertical Scale Score.

joint frequency distributions of the at- and below-level test scores for each grade. The da in the table show that the raw-score correlations are similar to the VSS correlations in mo cases. Where the two correlations differ, the VSS correlation tends to be larger, but n substantially. The low correlations for grade 1, and particularly for the fall administration, m be due to the unreliability of the tests at the early grade. It may also be observed that t correlations for the reading tests are slightly higher than for the math tests. The less-tha perfect correlations probably signify the unreliability of the tests, and a departure from t 'measuring the same thing' postulate, among other things.

In order to assess the validity of the resulting vertical scales, a random sample of 500 cas was selected for each grade at each test administration to provide data for comparisons the scores obtained with the two different test levels. Table 1-9 presents the results of the comparisons. Large discrepancies in group means were found in both reading and math the spring at grade 3, and for math in the spring at grade 5. Inspections of their raw sco distributions (see Figures 1-5 and 1-7 presented in a later section) reveal serious ceiling effec in these cases when the below-level tests were administered. The discrepancies in gro means for the rest of the cases are not substantial. Thus, for the purpose of group analys when different test levels were involved, the resulting vertical scale provides a good basis f comparing the means as long as no large ceiling or floor effects arise by the choice of particular test level.

The statistics given in the last two columns of the table, however, indicate that considerab discrepancies between the scores obtained with different test levels exist at the individu level. There are many reasons for this discrepancy other than the imperfect equating of th test levels. Among them, the unreliability of the tests and the extent of matching between th test level and the individual's performance level can both affect the test scores. The averag amount of the absolute between-level differences ranges from nearly one estimated standa deviation for the VSSs in the population to about one-third of a standard deviation (see Tab 1-12 for the projected population standard deviation of VSSs). Consequently, when individu scores are of primary concern, e.g., scores are used to assess an individual's progress individualized instructional settings, or to decide if a student needs CE, the selection of a te level commensurate with the student's functional level may be important. The effects of te levels on performance will be further examined in the last section of this chapter.

To provide more insight into the characteristics of the resulting vertical scale, VSSs corre sponding to the same empirically-determined percentile ranks for the same population bu with different test levels are compared in Table 1-10 for selected percentile ranks. For thi comparison, the debiased reading and math tests were used. In some cases where the selecte percentile rank does not coincide with one that is assigned to some discrete raw score, linea interpolations were employed to derive the corresponding VSSs. The data reveal that th discrepancies between the VSSs for the two test levels are, with a few exceptions, not large However, the 75th percentile for math in the spring norm for grades 3 and 5 are quit substantial, evidently due to the ceiling effects mentioned earlier.

Finally, as in the case of percentile norms, the SES vertical scale scores for the reading test of levels 1, 2, and 3 are compared with the corresponding expanded standard scores (ESS

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Table 1-9

Differences between At- and Below-Level Vertical Scale Scores for the Debiased Reading, Math, and Basic Skills Tests*

Skill Area	Grade/ Testing Time	At-Level		Below-Level		Difference		Average Absolute Difference	RMS of Difference**
		Mean	S.D.	Mean	S.D.	Mean	S.D.		
	1-Fall	345.21	35.74	344.32	33.08	.89	37.46	29.35	37.43
	1-Spring	404.92	47.70	407.85	44.42	−2.93	30.87	24.09	30.98
	2-Fall	420.62	51.70	418.16	43.99	2.46	30.55	24.07	30.62
R	2-Spring	464.93	52.00	463.32	50.54	1.61	34.01	26.09	34.01
E	3-Fall	461.16	56.03	464.41	53.75	−3.24	32.58	25.07	32.71
A	3-Spring	500.12	61.94	489.34	47.38	10.78	39.39	29.94	40.80
D	4-Fall	497.25	53.36	499.43	56.53	−2.19	31.37	24.05	31.42
I	4-Spring	525.00	60.40	531.24	59.46	−6.24	29.11	23.20	29.74
N	5-Fall	532.83	64.79	533.17	62.43	−.34	30.96	23.30	30.93
G	5-Spring	559.22	69.02	559.25	63.67	−.04	35.80	26.93	35.77
	6-Fall	555.74	69.78	562.58	70.77	−6.84	35.43	27.98	36.05
	6-Spring	585.81	72.45	587.85	71.04	−2.04	33.08	25.62	33.11
	1-Fall	332.41	34.69	332.13	34.66	.29	30.38	24.38	30.35
	1-Spring	390.44	43.00	389.80	42.91	.64	29.39	22.76	29.37
	2-Fall	393.47	43.80	395.14	42.15	−1.67	29.60	22.77	29.62
	2-Spring	448.32	47.39	451.99	49.03	−3.66	28.77	22.70	28.97
M	3-Fall	439.36	49.77	448.89	50.58	−9.53	31.29	25.61	32.68
A	3-Spring	508.86	59.81	487.62	43.50	21.23	38.22	32.62	43.69
T	4-Fall	491.50	51.68	496.99	55.07	−5.49	36.80	29.10	37.17
H	4-Spring	546.09	67.22	549.42	57.27	−3.33	40.89	30.45	40.98
	5-Fall	546.53	67.29	546.46	59.30	.07	37.68	29.27	37.64
	5-Spring	594.96	72.24	572.94	54.69	22.02	43.54	37.23	48.75
	6-Fall	581.94	67.07	588.39	68.09	−6.45	45.04	35.65	45.45
	6-Spring	635.37	82.30	628.82	77.10	6.55	41.72	33.35	42.19
B	1-Fall	312.95	36.22	312.40	35.64	.55	31.67	24.44	31.64
A	1-Spring	383.28	48.30	385.46	47.84	−2.18	26.84	21.27	26.90
S	2-Fall	395.38	49.42	394.63	46.78	.75	25.28	20.17	25.26
I	2-Spring	453.92	51.34	454.91	55.01	−.99	27.59	21.78	27.58
C	3-Fall	446.82	55.86	452.73	56.57	−5.91	28.20	22.13	28.78
	3-Spring	505.35	60.85	491.82	51.54	13.53	33.61	26.38	36.20
S	4-Fall	494.84	52.34	498.87	55.53	−4.03	28.50	22.39	28.76
K	4-Spring	536.26	61.39	543.18	60.74	−6.91	27.87	21.76	28.69
I	5-Fall	541.26	64.35	543.61	63.03	−2.35	26.71	20.79	26.79
L	5-Spring	579.18	69.63	573.20	63.29	5.98	30.79	24.30	31.34
L	6-Fall	569.33	67.83	577.98	68.64	−8.65	31.64	25.56	32.59
S	6-Spring	612.07	77.92	612.17	74.33	−.10	30.09	23.79	30.06

* Differences are obtained by subtracting the Below-Level Scores from the At-Level Scores. Data based on a random sample of 500 from each grade/testing time were used.

** RMS = square root of the mean of squares.

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Table 1-16

Difference Between At- and Below-Level Vertical Scale Scores (VSS) for Selected Percentile Ranks

Grade * Level	Test Levels At/Below	Percentile Rank					
		10th	20th	25th	30th	50th	75th
		Debiased Reading: At-Level VSS Minus Below-Level VSS					
1.1	B/A	8	3	2	1	0	−9
1.8	C/B	−7	−12	−13	−11	−1	−2
2.1	C/B	−4	−6	−9	−9	1	−1
2.8	1/C	−3	−10	−10	−8	2	−2
3.1	1/C	−1	−11	−12	−8	1	−4
3.8	1/C	−11	−2	4	5	2	7
4.1	2/1	5	0	−8	−11	−3	3
4.8	2/1	−3	−10	−8	−5	6	−11
5.1	2/1	−2	−8	−8	−3	8	−6
5.8	2/1	−8	4	7	12	0	−8
6.1	3/2	−1	−10	−14	−13	1	4
6.8	3/2	−7	−10	−6	−1	11	−6
		Math: At-Level VSS Minus Below-Level VSS					
1.1	B/A	1	2	2	2	−1	−2
1.8	C/B	1	1	−2	−2	−3	0
2.1	C/B	2	1	−2	−1	−1	2
2.8	1/C	−2	−5	−4	−2	1	−7
3.1	1/C	−3	−7	−6	−6	−2	−9
3.8	1/C	6	11	10	11	13	31
4.1	2/1	0	−6	−6	−8	−5	−2
4.8	2/1	−15	−11	−5	−3	0	−1
5.1	2/1	−8	−9	−6	−2	−1	−2
5.8	2/1	−5	3	6	7	12	26
6.1	3/2	1	−11	−12	−14	−14	−2
6.8	3/2	−6	−9	−6	−1	15	16

*g.1 indicates Test Administration in fall (September-October) and g.8 indicates Test Administration in spring (April-May).

furnished by the publisher. Since both the VSS and the ESS are regarded as interval scales, a meaningful comparison is to map one set of scores linearly onto the other. Simple linear regression was employed for this purpose, showing that the two scales are linearly related to each other by the following equation:

$$VSS = 175.67 + .82 \cdot ESS,$$

with a squared multiple correlation of .966.

Grade Equivalent Scales. Because of the insufficient number of grades involved in the standardization sample, a satisfactory calibration of a grade-equivalent (GE) scale cannot be

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chieved. However, the Participation Study of the SES required the GE score to determine he low-achieving status of a student. We, therefore, attempted to create a GE scale based n the fall test data. With only six grades tested, a decision was made to obtain only a partial cale that extends from .1 to 6.9. Any VSS greater than that corresponding to a GE of 6.9 vas assigned a GE of 7.0, and any VSS below that for a GE of .1 was assigned a score of.0. ven with this special adjustment, the GE scores above 6.1 and below 1.1 were derived ntirely by extrapolations. This procedure can result in scores that are quite erratic. Conse- uently, the use of a GE scale so obtained is to be discouraged. Fortunately, the Participation tudy required only cut-off scores for the determination of whether a student is performing ne grade or more below nominal grade-level. To this end, the resulting GE scale gives cut-off cores closely in agreement with the median scores of one grade below the concerned grade, nd thus meets the data need quite well. The procedures for deriving a GE scale was basically arallel to that employed by the publisher of the CTBS. Briefly, a polynomial surface function f the VSS (V) and the grade level (G) was fitted for the standard normal deviates (z) of the est scores.

$$z = P_z(V,G) = \sum_{m=0}^{K-k} a_{km} V^k G^m$$

where K is the degree of the polynomial function, and a_{km}'s are the coefficients to be stimated from the data. The data consist of six sets of score pairs (z_{gj}, v_{gj}) based on at-level est data, one set from each grade, g.

The scale score to be assigned as a given GE score g is then obtained by finding the root v_g of the fitted polynomial equation with G = g, i.e.,

$$0 = P_z(V,G \mid G=g) = \sum_{k=0}^{K} b_k V^k = f_g(V),$$

$$\text{where } b_k = \sum_{m=0}^{K-k} a_{km} g^m$$

The rationale for this is that the root of $f_g(V) = 0$ is the inferred median VSS for grade g as t corresponds to a normal deviate of zero. The convention is to find two roots at $g \pm .05$ o provide the range of scale scores that are assigned a GE score of g on the basis that one decimal place is used to represent the 10 months of a GE unit postulated for a calendar year. These procedures were applied to the fall test data to yield a preliminary GE scale for use in he Participation Study.

Our plan was to combine the fall and spring test data to produce 12 sets of score pairs for the complete calibration of the GE scale. This enlarged data base would lend some credibility to the GE scores between 6.1 and 6.9, as extrapolation would not be needed. However, the scale still has to be limited to an upper bound of 7.0 because no data from grade 7 and beyond were collected. The attempt to derive a GE scale by combining the fall and spring test data

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failed to produce satisfactory results largely because the combined cross-sectional data fron the six grades do not maintain the monotonicity between the fall and the previous spring More specifically, when median scores of the two test administrations for the six grades wer placed on a common grade continuum, a decreasing trend was found from one spring to th next fall. As demonstrated in Figures 1-1 and 1-2 for the debiased reading and math tests respectively, the VSS associated with a given percentile in the fall for a given grade is no higher, but rather slightly lower than the corresponding VSS in the spring for the grad immediately preceding it. This lack of summer gain is not unique to the present data. Th standardization of the 1973 edition of the Stanford Achievement Test by its publisher foun the same phenomenon (Madden et al., 1975). Considering the curves presented in thes figures as approximate growth curves for the students at different percentiles, a zig-zag for is observed if the fall and spring time points were placed on the same continuum. Viewe separately for the fall and the spring data points, the figures reveal a different picture. appears that the growth curves examined in the fall or spring alone are monotonicall increasing and nearly linear. This characteristic applies to curves for each of the three quar tiles. Thus, if cross-sectional data from a single test administration are employed, the require ment of the monotonically increasing trend of VSS with grade level leads to the calibratio of a reasonable GE scale. Contrary to the situation of a single test administration, when dat from two administrations (at the beginning and the end of the school year) were combined the growth curves no longer conform to the idea that VSSs are monotonically increasing wit grade/testing time. If this difficulty is to be overcome to yield a GE scale for the scores, th results would defy the semantic definition that a GE of g represents the population media score of the grade level g. The substantial adjustments required to smooth the zig-zag curv in the process of deriving the GE scale could produce considerable distortions of the data In passing, note that though the curves in Figures 1-1 and 1-2 were plotted with at-level tes results, they are similar when below-level tests are used. The interested readers may plot thei own curves using below-level scores from data contained in these figures with the help of data presented in Table 1-10.

In view of the fact that GE scores have often been misused even if they were free from such distortions, the development of a new GE scale for the SES was aborted. Even if we had calibrated the GE scale in spite of the unsatisfactory results, the scale would be so incomplete (no refinement beyond 6.9) as to be useless for most analyses. Consequently, no tables for converting raw scores to GEs are provided for the tests.

PROJECTED POPULATION STATISTICS

As a description of the student population involved in the SES, means and standard deviations were computed on the basis of the projected national frequency distributions for the debiased reading, math, and debiased basic skill scores. These descriptive statistics were obtained in terms of raw scores as well as vertical scale scores because the latter are used in most of the analyses for the SES reports. In addition, the projected frequency distributions of test scores are presented graphically so that the readers can acquire a better picture of the forms of the distributions. The characteristics of these distributions may affect the results of the test equating discussed in the previous section.

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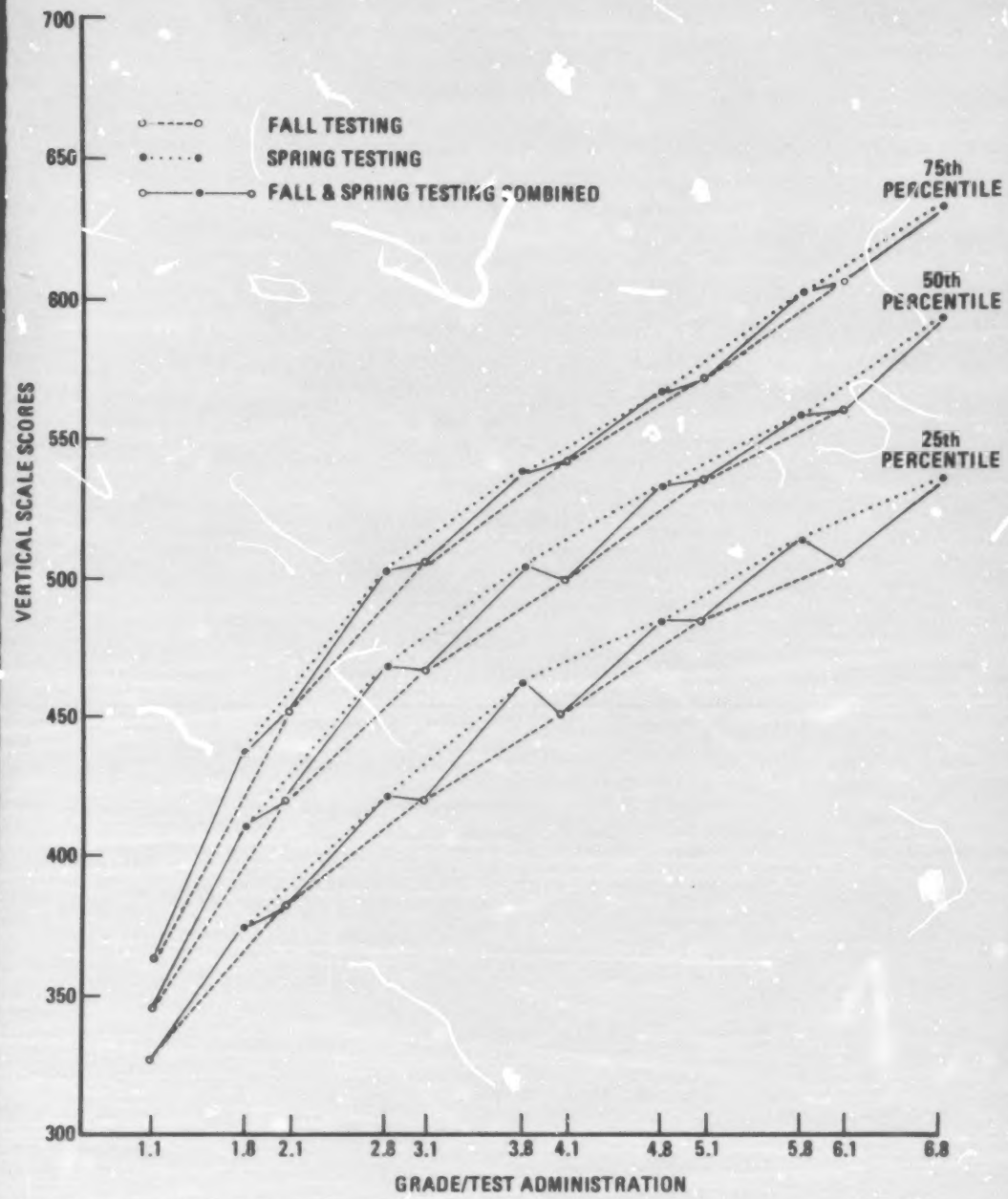

Figure 1-1. Vertical Scale Scores as a Function of Grade Level by Quartiles for the Debiased CTBS Reading Test

Note: The spring-to-fall differences are always associated with cross-sectional changes in samples and are frequently also associated with differences in test levels. Negative 'growth', when it occurs, may be attributed to sample differences and test-level differences. When raw scores are compared for the same test levels, the differences are either positive or small when negative. Therefore, the zig-zag nature of the curves above should not be carelessly attributed to 'summer drop-off'.

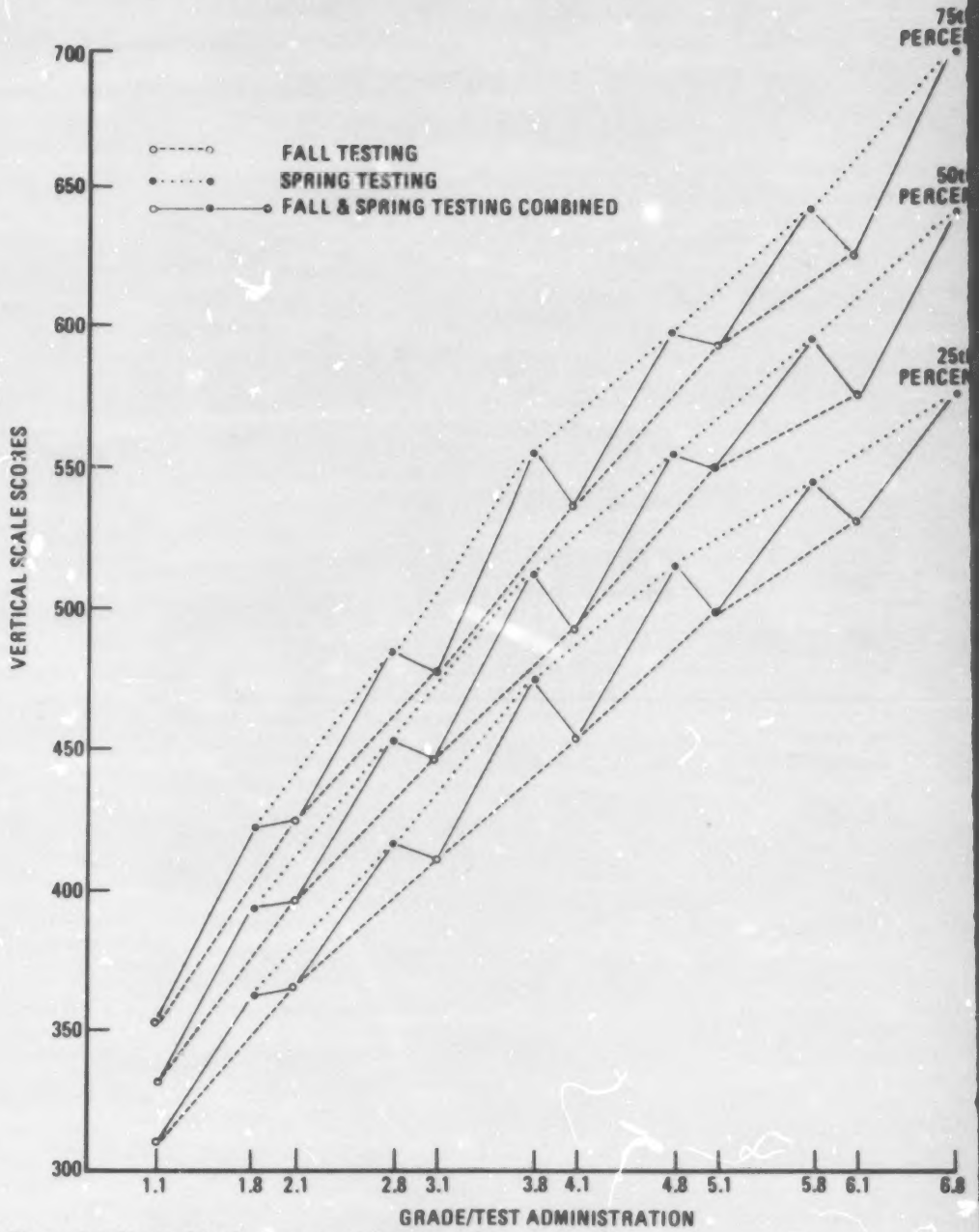

Figure 1-2. Vertical Scale Scores as a Function of Grade Level by Quartiles for the Debiased CTBS Math Test

Note: The spring-to-fall differences are alway[illegible] associated with cross-sectional changes in samples and [illegible] frequently also associated with differences in test levels. Negative 'growth', when it occurs, may [illegible] attributed to sample differences and test-level differences. When raw scores are compared for the sa[illegible] test levels, the differences are either positive or small when negative. Therefore, the zig-zag nature of t[illegible] curves above should not be carelessly attributed to 'summer drop-off'.

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atistics and frequency distributions of raw scores. Table 1-11 presents the projected eans and standard deviations of the raw scores for the debiased tests by grade, test adminis- tion, and test level. Examination of the table shows that when the same test level is volved, the means generally increase with grades. Occasionally, means for a fall testing are ghtly lower than those for the spring testing at a preceding grade. This situation occurs more ten for math than for reading, but appears to be less drastic than that found in VSSs for given artiles (see Figures 1-1 and 1-2). For a fixed test level, the standard deviations also tend increase with grades. The exceptions are found when the test exhibits pronounced ceiling fects. For instance, the standard deviations for grade 3 in the spring are considerably smaller an those for the other grades when level C is employed. A similar phenomenon is observed r level 1 in the spring at grade 5.

he projected relative frequency distributions of the raw scores are presented in graphic form Figures 1-3 through 1-8 for the six grades. Each figure contains eight relative frequency urves for the fall and spring administrations of reading and math tests, with two test levels ch. The frequency curves for reading are based on the debiased scores. These frequency urves show the distribution form for the test scores in detail, and thus provide some insight n how well they may be normalized (a charcteristic relevant to the equating procedures) and ow well the normalized score distributions may conform to the assumptions of the absolute near scaling method. A study of these curves also gives information on the appropriateness f a given test level for a certain grade in the general population. For example, unless a group f third graders was performing well below their peers, level C is too easy for them in the pring and, if used, will cause problems of ceiling effects.

tatistics for Vertical Scale Scores. Table 1-12 presents the projected means and standard eviations for the debiased tests in terms of Vertical Scale Scores. These statistics give some nformation about the success of the test equating. Ideally, when the equating is perfect, the wo test levels administered at each grade should produce the same results; at the least, the ame descriptive statistics like means and standard deviations. The means obtained with the wo test levels are generally quite similar. Exceptions are found in the spring results at grades and 5. The large ceiling effects of the below-level tests (levels C and 1 for grades 3 and 5, espectively) probably account for the less successful equating in these cases. Likewise, the iscrepancie s in standard deviations for these cases are substantial, a direct consequence of he smaller variances when ceiling effects exist. The observed tendency is for both means and tandard deviations of the VSSs to increase with grade levels.

CHARACTERISTICS OF THE SELECTED CTBS TESTS

n order to provide item-level statistics (e.g., item difficulties and item-total correlations), nternal consistencies, and intercorrelations between sub-skill areas within a test, a sample of 500 cases was randomly selected for each test level and each test administration by grade. tem analyses were performed with these randomly sampled data. Since sub-test scores are not analyzed in the main study, the correlations between the two sub-tests within each skill area give some indication about the extent that the sub-skill scores are linearly related (and

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Table 1-11

Projected Population Means and Standard Deviations for the Debiased CTBS Scales — Raw Score
Test Administrations: 1976-77 School Year

Test Level	Grade/ Testing Time *	Skill Area								
		Reading			Math			Basic Skills Total		
		Number of Items	Mean	S.D.	Number of Items	Mean	S.D.	Number of Items	Mean	S.D.
Level A	1.1	47	35.26	9.99	26	17.60	4.48	73	52.86	13.46
Level B	1.1	43	14.46	7.09	46	16.25	6.89	89	30.71	12.06
	1.8	43	30.41	10.04	46	30.02	9.99	89	60.47	18.39
	2.1	43	31.68	10.19	46	30.36	9.77	89	62.08	18.04
Level C	1.8	50	25.67	12.12	40	18.10	7.31	90	43.80	17.74
	2.1	50	27.81	12.63	40	18.62	7.36	9[illegible]	46.45	18.10
	2.8	50	38.39	11.13	40	28.26	8.23	9[illegible]	66.68	17.71
	3.1	50	38.47	11.24	40	27.64	8.32	90	66.13	17.80
	3.8	50	43.43	8.37	40	34.02	6.06	9[illegible]	77.48	13.02
Level 1	2.8	83	39.09	17.26	73	35.71	13.71	156	74.84	28.77
	3.1	83	39.47	18.22	73	33.64	13.10	156	73.13	29.21
	3.8	83	50.91	19.14	73	52.46	14.65	156	103.43	31.53
	4.1	83	50.36	19.48	73	48.82	15.48	156	99.22	32.78
	4.8	83	59.29	18.05	73	60.36	12.40	156	119.71	28.50
	5.1	83	59.14	18.55	73	59.41	13.21	156	118.59	29.80
	5.8	83	65.31	16.62	73	64.50	10.06	156	129.84	24.83
Level 2	4.1	85	36.85	15.60	73	29.47	9.78	158	66.34	23.38
	4.8	85	45.17	17.44	73	40.28	13.03	158	85.51	28.39
	5.1	85	45.97	18.12	73	39.25	12.77	158	85.24	28.69
	5.8	85	53.39	18.24	73	47.95	13.43	158	101.38	29.56
	6.1	85	53.71	18.14	73	46.64	12.99	158	100.38	28.86
	6.8	85	60.09	17.45	73	53.77	12.56	158	113.90	27.09
Level 3	6.1	82	37.86	15.51	73	27.00	9.51	155	64.87	22.94
	6.8	82	44.40	16.93	73	36.90	14.35	155	81.32	29.04

*g.1 indicates fall testing, September-October.
g.8 indicates spring testing, April-May.

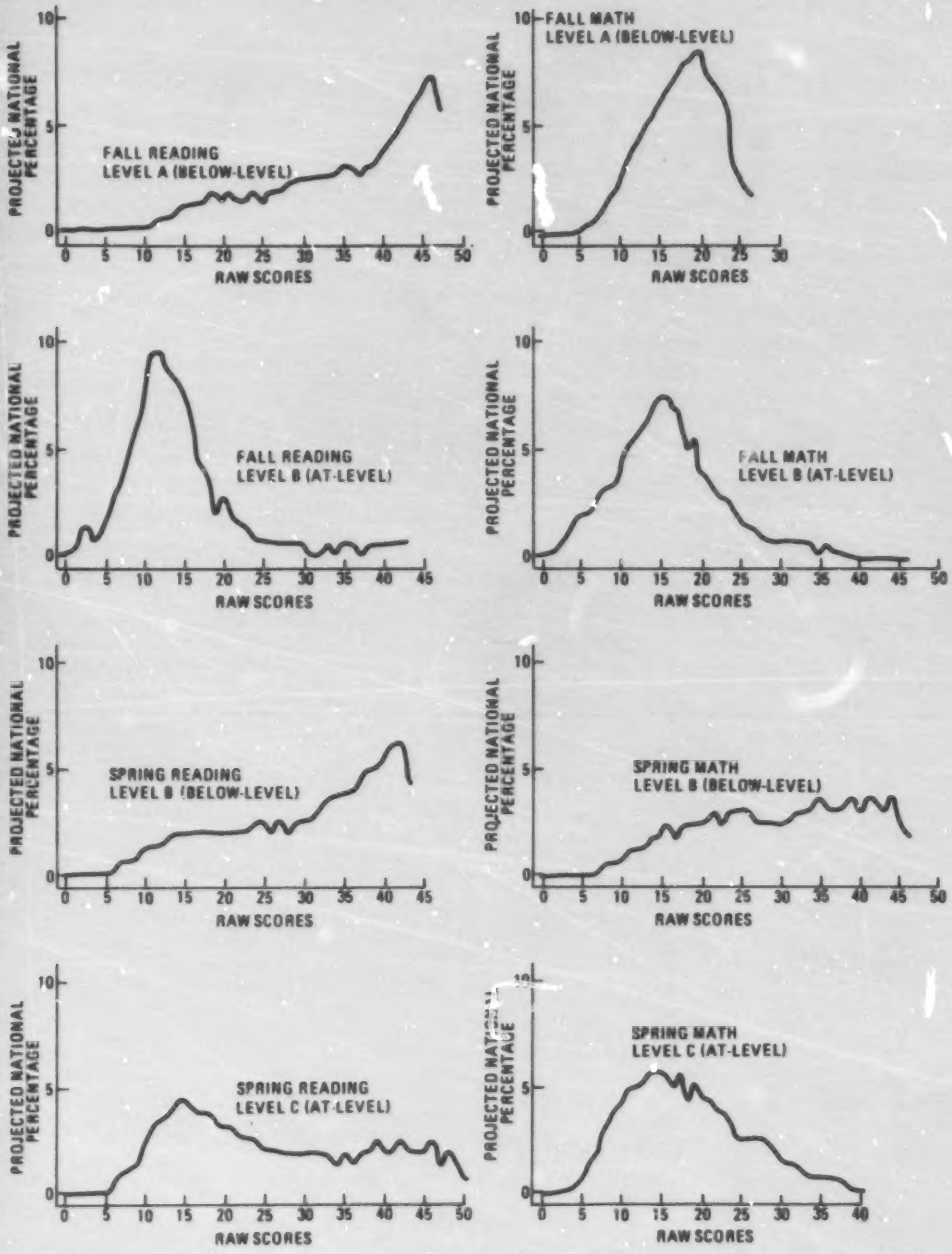


Figure 1-3. Projected Frequency Distributions of CTBS Reading and Math Scores for Fall and Spring Administrations in Grade 1, School Year 1976-77

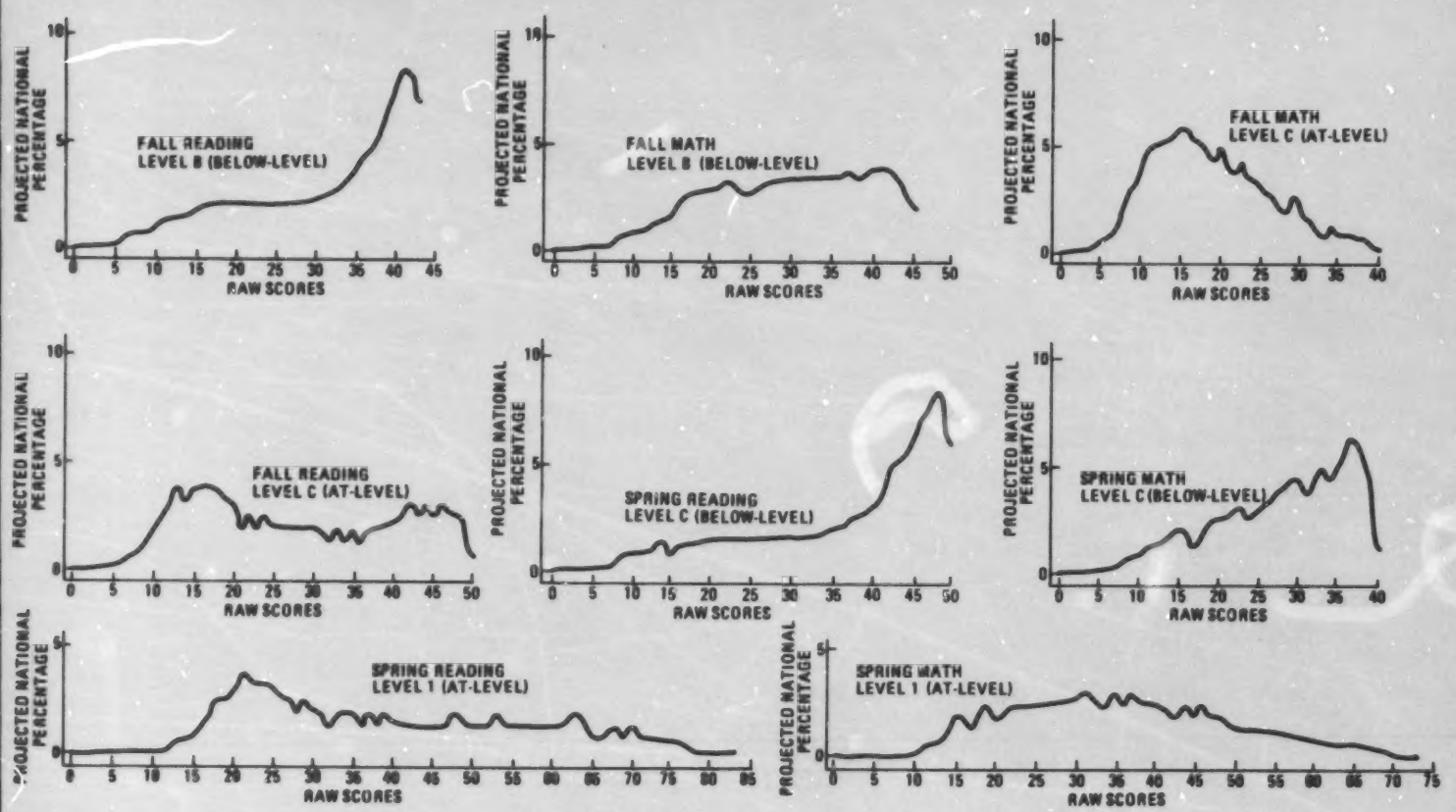


Figure 1-4. Projected Frequency Distributions of CTBS Reading and Math Scores for Fall and Spring Administrations in Grade 2, School Year 1976-77

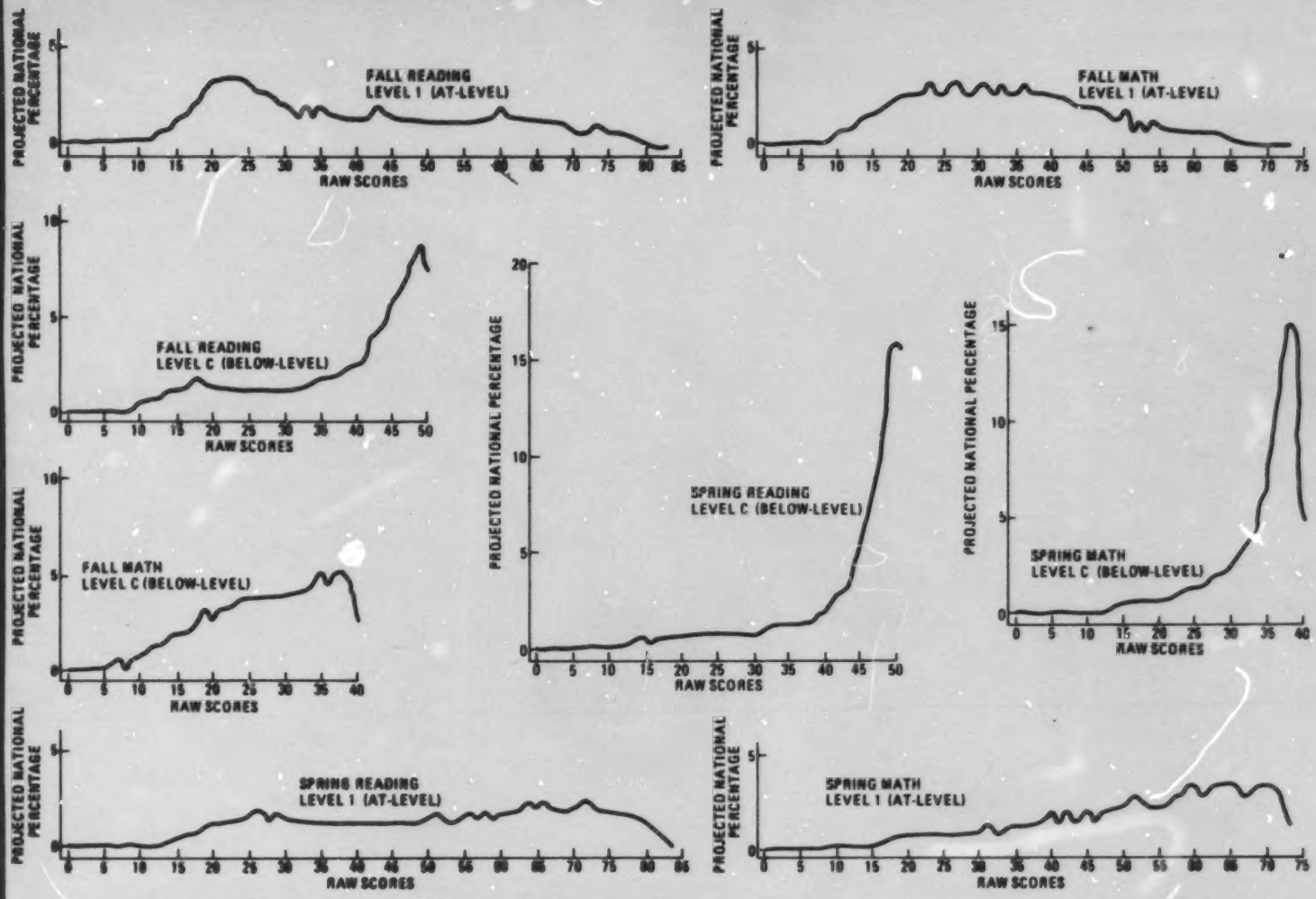


Figure 1-5. Projected Frequency Distributions of CTBS Reading and Math Scores for Fall and Spring Administrations in Grade 3, School Year 1976-77

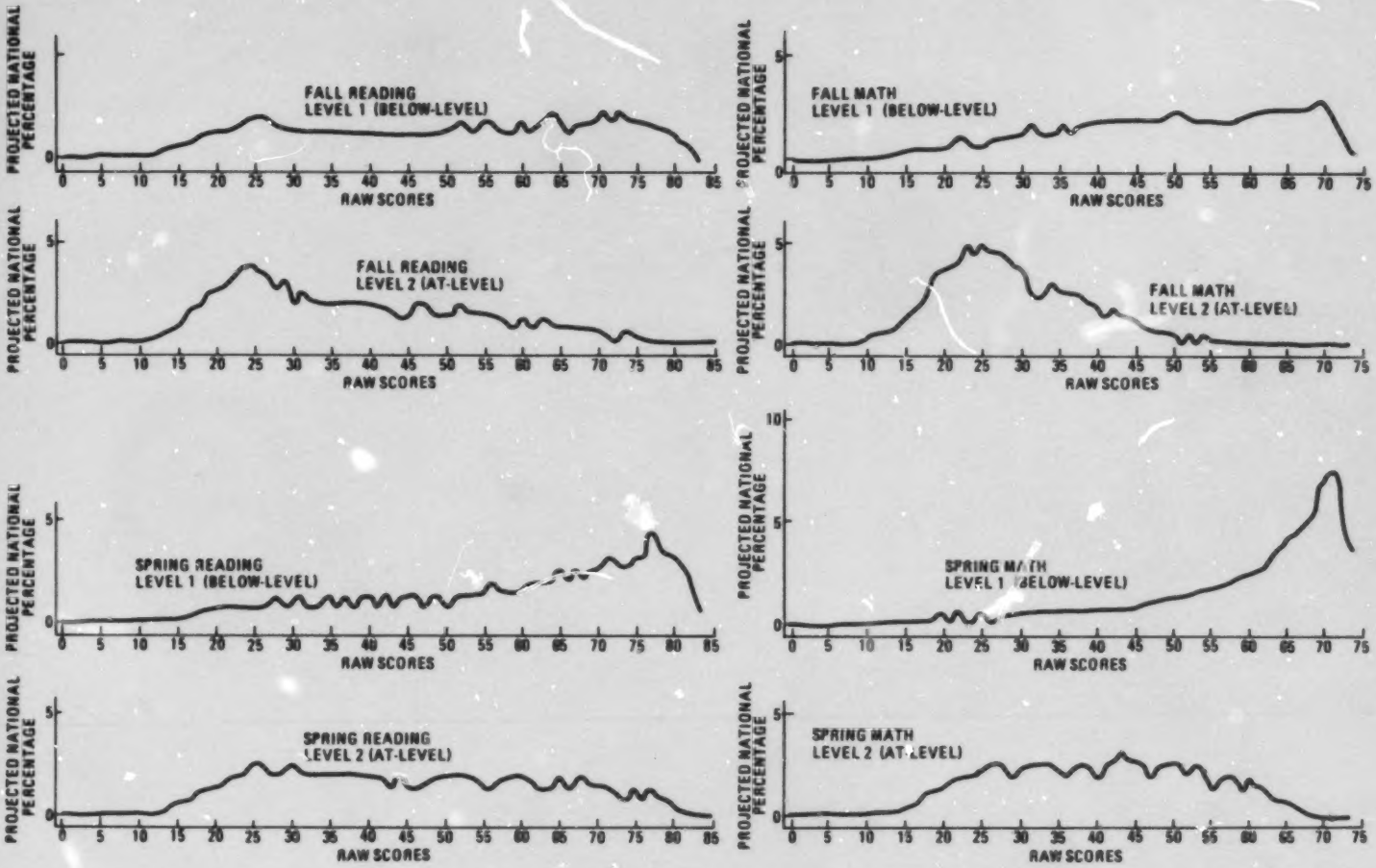


Figure 1-6. Projected Frequency Distributions of CTBS Reading and Math Scores for Fall and Spring Administrations in Grade 4, School Year 1976-77

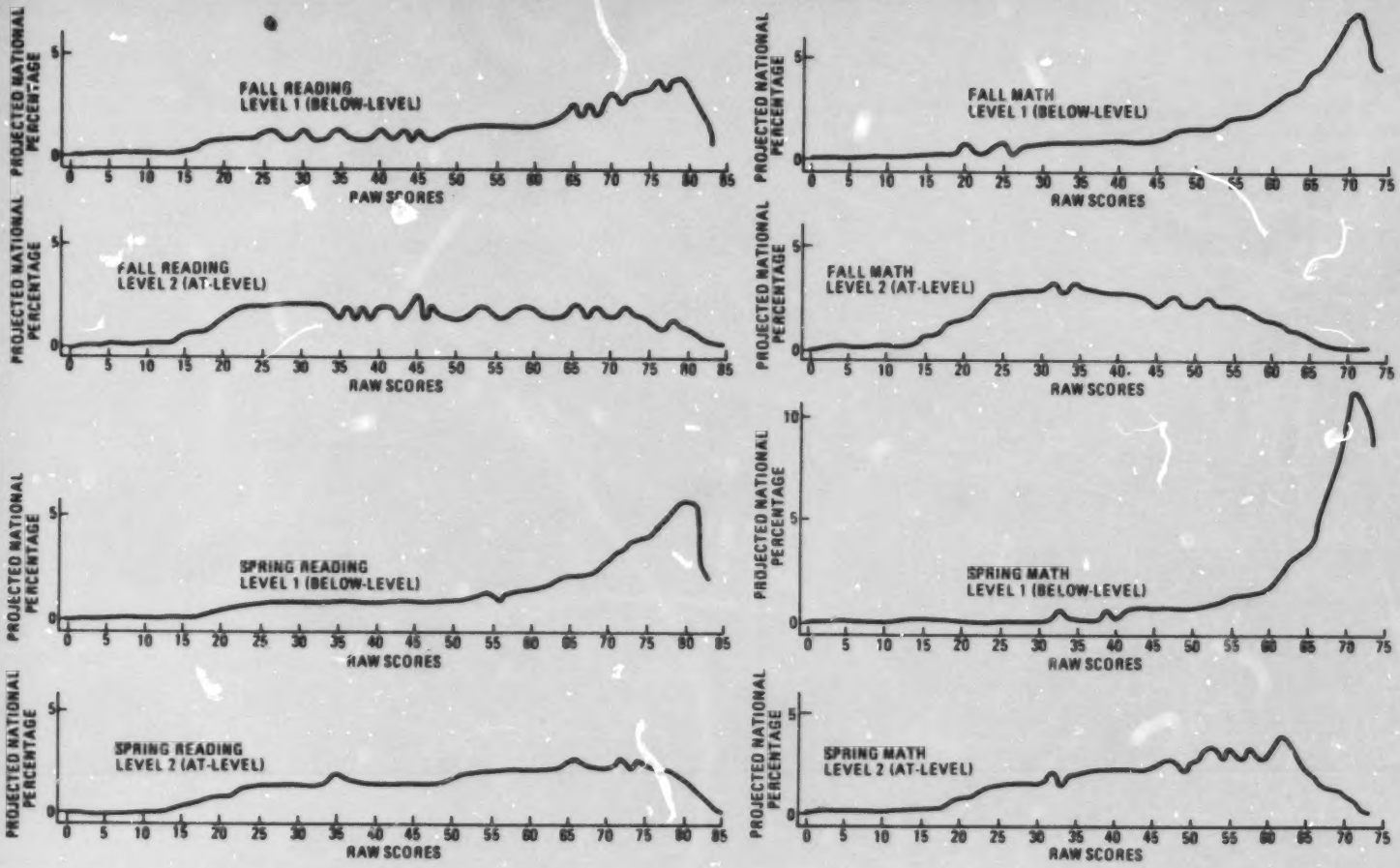
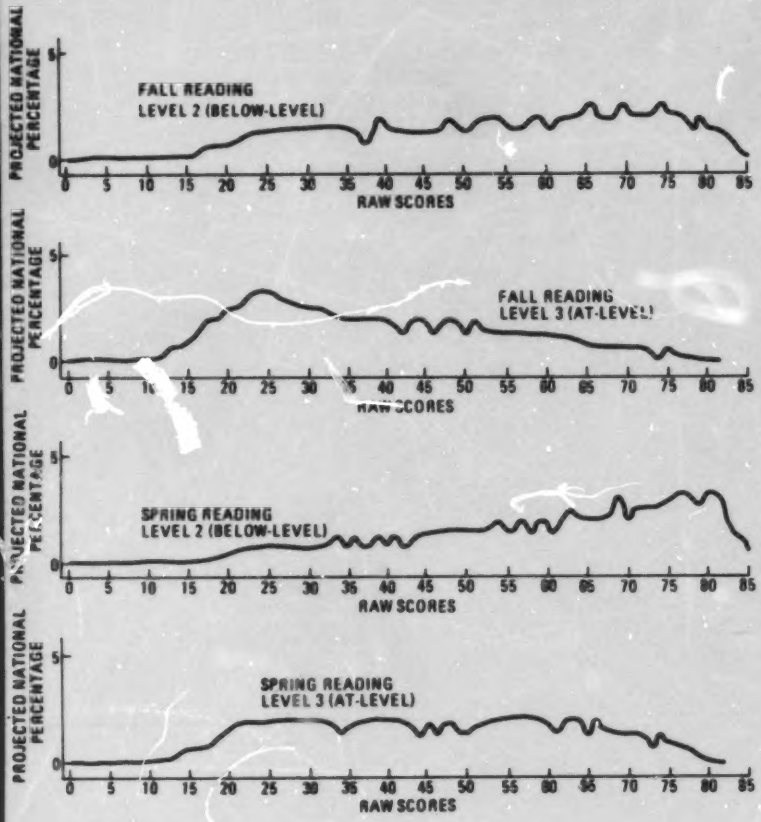


Figure 1-7. Projected Frequency Distributions of CTBS Reading and Math Scores for Fall and Spring Administrations in Grade 5, School Year 1976-77



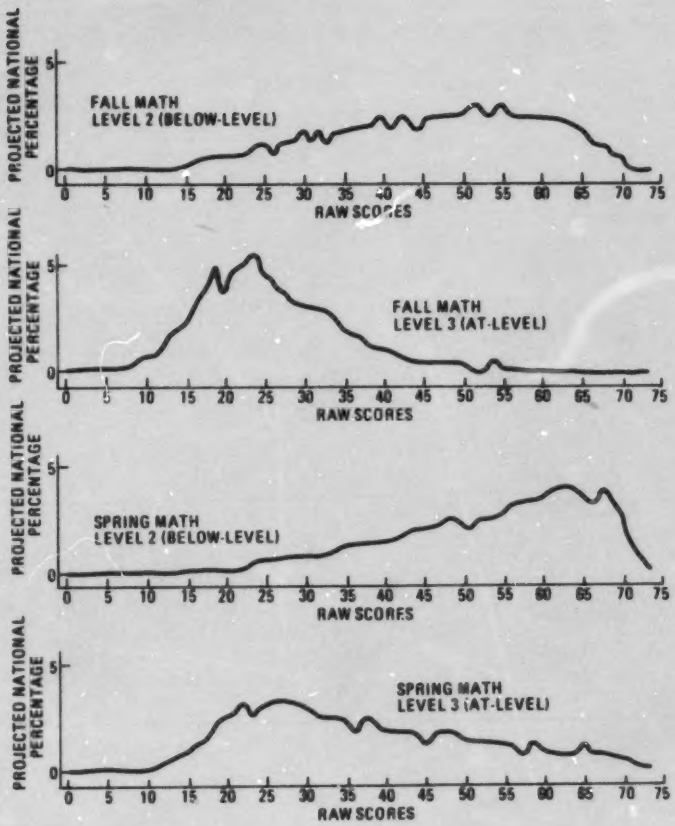


Figure 1-8. Projected Frequency Distributions of CTBS Reading and Math Scores for Fall and Spring Administrations in Grade 6, School Year 1976-77

Table 1-12

Projected Population Means, and Standard Deviations for the Debiased CTBS Scales – Vertical Scale Score Test Administrations: 1976-1977 School Year

Grade	Skill Area		Testing Time			
			Fall (September-October)		Spring (April-May)	
			Level A	**Level B**	**Level B**	**Level C**
	Reading	Mean	347.24	347.50	412.46	411.26
		S.D.	33.45	34.09	42.29	49.10
1	Math	Mean	333.39	333.51	395.37	394.51
		S.D.	35.34	35.68	43.95	43.71
	Basic Skills	Mean	315.04	314.96	392.09	389.95
		S.D.	36.35	36.06	48.07	49.84
			Level B	**Level C**	**Level C**	**Level 1**
	Reading	Mean	418.69	420.02	464.76	464.32
		S.D.	44.09	50.68	50.75	52.57
2	Math	Mean	396.81	397.69	453.94	451.98
		S.D.	42.92	43.58	50.19	49.87
	Basic Skills	Mean	396.13	397.18	456.72	455.44
		S.D.	47.44	49.37	55.69	53.34
			Level C	**Level 1**	**Level C**	**Level 1**
	Reading	Mean	466.50	465.07	492.36	501.21
		S.D.	51.75	56.12	45.41	60.33
3	Math	Mean	450.99	444.79	492.67	514.35
		S.D.	51.26	48.42	43.09	58.86
	Basic Skills	Mean	455.84	451.94	497.66	508.89
		S.D.	56.66	55.03	51.31	59.86
			Level 1	**Level 2**	**Level 1**	**Level 2**
	Reading	Mean	499.70	497.32	531.03	527.98
		S.D.	61.88	58.66	63.23	62.69
4	Math	Mean	500.46	495.51	550.45	551.49
		S.D.	59.91	54.93	57.78	67.14
	Basic Skills	Mean	501.12	496.29	544.30	540.47
		S.D.	62.00	57.53	62.99	63.73
			Level 1	**Level 2**	**Level 1**	**Level 2**
	Reading	Mean	530.29	530.59	555.60	558.46
		S.D.	64.91	66.40	64.77	68.88
5	Math	Mean	546.30	546.32	572.90	592.80
		S.D.	60.22	65.66	52.59	73.42
	Basic Skills	Mean	541.93	539.59	570.42	577.91
		S.D.	64.76	64.76	62.23	70.28

Table 1-12 (Continued)

			Level 2	Level 3	Level 2	Level 3
	Reading	Mean	559.67	557.29	586.14	585.45
		S.D.	68.71	68.02	71.73	71.81
6	Math	Mean	585.03	576.81	628.66	636.33
		S.D.	69.30	67.46	77.75	83.36
	Basic Skills	Mean	575.01	568.28	611.52	612.73
		S.D.	67.81	67.26	75.09	77.13

thus may measure the same underlying ability). The item 'difficulties' (actually, item 'easiness', because they are indexed by the percentage of examinees who give correct answers), which are directly related to the average test scores, can influence the shape and dispersion of the test score distributions. They are also related to test reliabilities in that if item difficulties of a test are clustered in the extreme values, then the KR-20 reliability estimate tends to be lower than that of a test composed of items with middle-range difficulties. Item-total point-biserial correlations reflect in part the extent of inter-item correlations, which in turn indicates the extent to which the items are measuring the same construct. Internal consistency is a form of reliability estimate that has often been employed by test publishers to obtain estimates of the standard error of measurement for the test scores.

In addition to the item statistics, test-retest reliability estimates, which generally involve alternate test levels, were computed based on randomly selected samples from the second-year representative schools (Hoepfner et al., 1977). These reliabilities were obtained for each grade sub-cohort that takes the same sequence of tests over the three test administrations in the first one-and-a-half years of the SES. In the longitudinal analyses that deal with growth (measures of change), and the effectiveness of CE, these reliability estimates may be used for the correction of unreliabilities in test scores. As suggested by Porter (1967), pretest reliability is often used to correct for the bias in the slope estimate and, thereby, the bias in the estimates of treatment effect, when ANCOVA models are employed to analyze data involving a nonequivalent control group design. In such analyses, individual pretest scores are regressed toward the group mean using within-group pretest reliabiliy as the method to obtain estimates of the pretest true scores (Kelley, 1927). The regressed scores were then entered into the ANCOVA model to compute estimates of treatment effects. Ideally, the parallel-form estimate of pretest reliability should be used, but it is usually unavailable. Short-term test-retest reliability is an alternative choice. In the present study, if the same test of different levels were perfectly equated, the at- and below-level correlations (see Table 1-8) in terms of VSSs may be regarded as one form of a short-term test-retest reliability estimate. When there is no single superior estimate of reliability, a defensible practice is to use a range of likely values of reliability to obtain several corrections and then draw conclusions from the set of results. In this case, the coefficient of internal consistency (KR-20), which is almost always available, may be chosen as an upper value of the range of reliabilities to be considered. It may be remarked that the internal consistency often represents an overestimate of the test reliability because of correlated errors (Cronbach and Furby, 1970).

In yet some other special cases, the test-retest reliability estimates obtained here may become the pretest-posttest correlation that is appropriate for correcting bias in the estimates of treatment effects via ANCOVA for a quasi-experimental design. Specifically, if the selection of treatment groups is based on some stable group differences, then, under Campbell's *Fan Spread Hypothesis* for between-group growth, the pretest-posttest correlation is the appropriate correction factor for the ANCOVA (Campbell and Boruch, 1975; Kenny, 1975).

Finally, because scores for both skill areas, reading and math, are analyzed in the SES, it is of interest to examine their intercorrelations. Knowledge of the extent of the correlations between the two scores would aid us in the understanding of the results obtained in the separate analyses, and results in cases where basic skill total scores are analyzed. These correlations were also computed based on randomly selected samples from the standardization database.

Item Statistics and Internal Consistencies. Table 1-13 presents the ranges of item difficulties, ranges of item-total correlations, correlations between subtests in a skill area, and internal consistencies for the debiased reading tests by test levels and by grade/test administrations. As expected, the average item difficulties increase with grade level for a given test level. With few exceptions, the average item difficulties fall within a range of .40 to .80, indicating that for a group of randomly sampled students, the two adjacent test levels administered are quite reasonable in terms of difficulties. These average item difficulties are plotted in Figure 1-9 for levels B through 3, which were administered at more than one grade. A decrease in average item difficulty (easiness) for level 1 is observed between the spring of grade 4 and the fall of grade 5, on the basis of the sample cross-sectional data. The figure may also be viewed in another way to show that the average percentage of items that are answered correctly decreases with test level for a given test administration. The item-total correlations are mostly between .20 to .70. Occasionally, a negative correlation is found for some items. Inspection of item content normally reveals some ambiguity in the alternative choices of the answers to the item. Except for levels A and B, administered in the fall to the first-graders, the scores of the two sub-skill areas are highly correlated (around the 80's). The internal consistencies exceed .90 for all cases, with only one exception: when the level B test is administered to first graders in the fall, the internal consistency drops to .84, largely because the test is too difficult for them.

Item-level data and internal consistencies for the math tests are presented in Table 1-14, and the average item difficulties are graphed by test level in Figure 1-10. The findings are very similar to those for the reading tests.

Test-Retest Reliabilities. Test-retest correlations were computed for three test administrations, fall of 1976, spring of 1977, and fall of 1977, by grade cohorts and by skill areas. Because two adjacent levels of tests were administered in the first year, the level that had smaller ceiling and floor effects was selected for each grade at each school to provide the test scores for use in the SES analyses. In later years of the study, only the selected test level is recommended for administration (see the first section of this chapter, page 11). As the 'SDC-recommended' level differs among schools, the sequence of test levels in the three administrations is not the

Table 1-13

Item Difficulties and Internal Consistencies of the Debiased CTBS Reading Scales*

Test Level	Grade/ Testing Time**	Number of Items	Item Difficulty			Item-Total Correlation		Correlation Between Sub-Tests	Internal Consistency (KR20)
			Minimum	Maximum	Average	Minimum	Maximum		
Level A	1.1	47	.47	.92	.74	.21	.66	.49	.93
	1.1	43	.18	.57	.33	.21	.48	.60	.84
Level B	1.8	43	.48	.83	.68	.34	.64	.79	.93
	2.1	43	.54	.86	.72	.40	.70	.79	.95
	1.8	50	.27	.80	.49	.29	.66	.77	.94
	2.1	50	.27	.84	.54	.32	.74	.82	.95
Level C	2.8	50	.44	.94	.75	.33	.73	.84	.96
	3.1	50	.47	.94	.75	.30	.74	.85	.96
	3.8	50	.57	.97	.84	.33	.73	.81	.95
	2.8	83	.21	.88	.45	.17	.67	.83	.95
	3.1	83	.22	.84	.46	.18	.70	.85	.95
	3.8	83	.34	.93	.59	.21	.68	.85	.96
Level 1	4.1	83	.31	.95	.58	.29	.70	.85	.96
	4.8	83	.40	.98	.72	.25	.67	.93	.97
	5.1	83	.38	.97	.68	.22	.73	.86	.97
	5.8	83	.49	.98	.78	.20	.66	.85	.97
	4.1	85	.15	.81	.43	−.01	.61	.82	.93
	4.8	85	.19	.87	.53	.12	.62	.85	.95
	5.1	85	.17	.86	.52	.11	.63	.86	.95
Level 2	5.8	85	.25	.91	.61	.16	.64	.86	.96
	6.1	85	.27	.94	.65	.23	.61	.85	.96
	6.8	85	.33	.96	.72	.17	.62	.84	.96
Level 3	6.1	82	.22	.84	.48	.14	.60	.83	.94
	6.8	82	.27	.87	.52	.17	.59	.82	.95

*Based on a random sample of 500 for each test level/grade combination.

**g.1 indicates test administration in fall (September-October), and g.8 indicates test administration in spring (April-May).

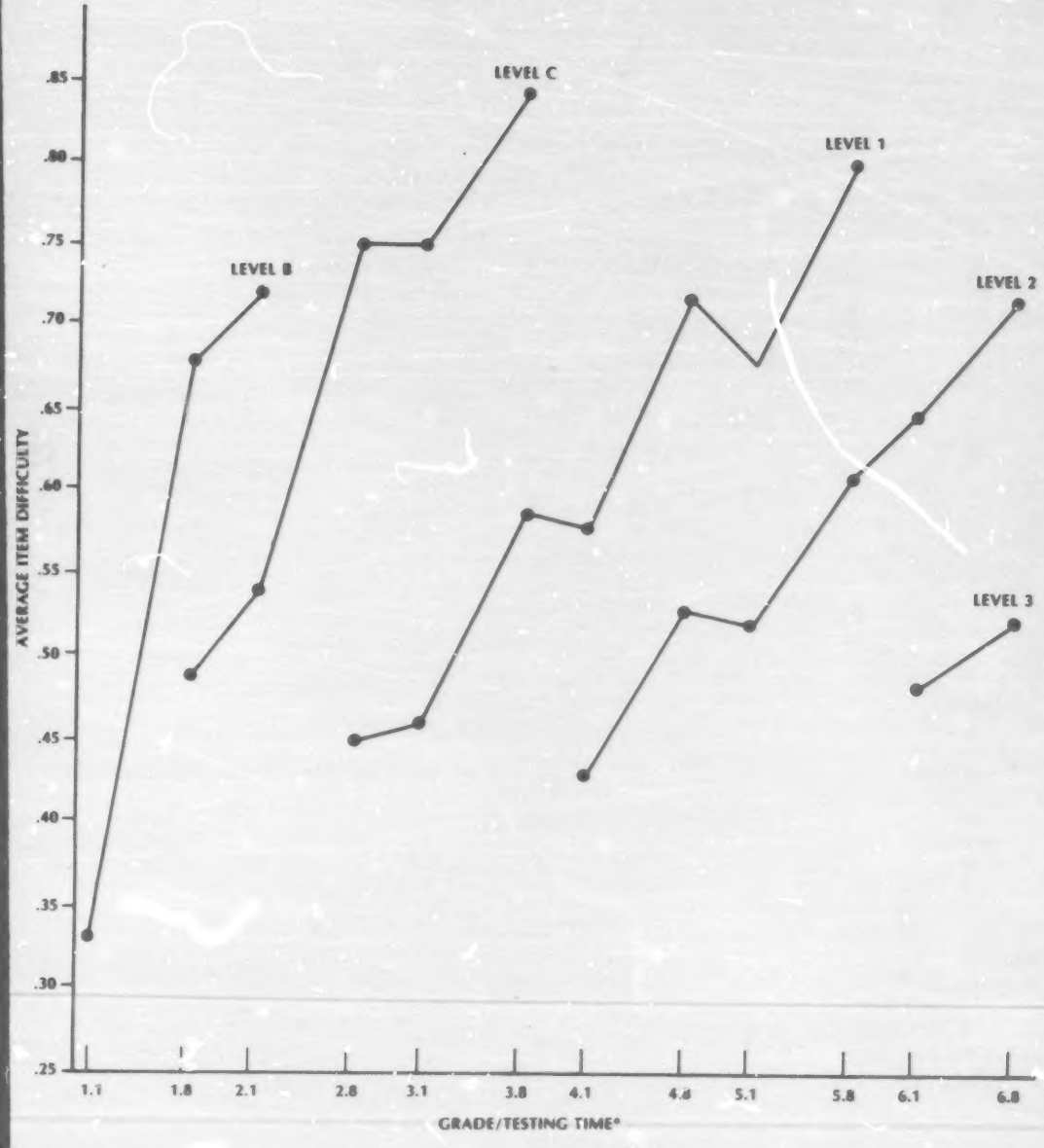


Figure 1-9 – Average Item Difficulty as a Function of Grade Level-Debiased CTBS Reading Scales
*g.1 indicates test administration in fall (September-October), and g.8 indicates test administration in spring (April-May).

Table 1-14

Item Difficulties and Internal Consistencies of the Debiased CTBS Math Scales*

Test Level	Grade/ Testing Time**	Number of Items	Item Difficulty			Item-Total Correlation		Correlation Between Sub-Tests	Internal Consistency (KR20)
			Minimum	Maximum	Average	Minimum	Maximum		
Level A	1.1	26	.24	.99	.68	.13	.55	N/A	.78
	1.1	46	.18	.65	.35	.12	47	.45	.87
Level B	1.6	46	.37	.90	.64	.26	.65	.70	.92
	2.1	46	.28	.91	.65	.28	.62	.68	.92
	1.8	40	.19	.84	.45	.15	.58	.66	.87
	2.1	40	.22	.89	.47	.15	.52	.61	.86
Level C	2.8	40	.38	.92	.69	.15	.63	.69	.91
	3.1	40	.41	.92	.67	.19	.64	.72	.91
	3.8	40	.41	.95	.84	.22	.62	.59	.90
	2.8	73	.14	.92	.47	.17	.54	.63	.93
	3.1	73	.10	.91	.44	.03	.54	.61	.91
	3.8	73	.38	96	.70	.21	.66	.71	.96
Level 1	4.1	73	.34	.96	.66	.24	.64	.72	.95
	4.8	73	.47	.98	.82	.19	.65	.71	.95
	5.1	73	.54	.98	.80	.09	.67	.70	.95
	5.8	73	.60	.99	.88	.12	.65	.70	.95
	4.1	73	.12	.93	.40	−.09	.48	.64	.86
	4.8	73	.17	.94	.55	.04	.61	.61	.92
Level 2	5.1	73	.13	.96	.52	−.22	.61	.67	.91
	5.8	73	.25	.97	.64	.13	.66	.73	.94
	6.1	73	.17	.97	.64	.03	.60	.67	.93
	6.8	73	.29	.98	.72	.17	.63	.66	.93
Level 3	6.1	73	.12	.80	.37	.05	.46	.59	.85
	6.8	73	.23	.87	.49	.21	.60	.71	.93

*Based on a random sample of 500 for each test level/grade combination.
**g.1 indicates test administration in fall (September-October), and g.8 indicates test administration in spring (April-May).

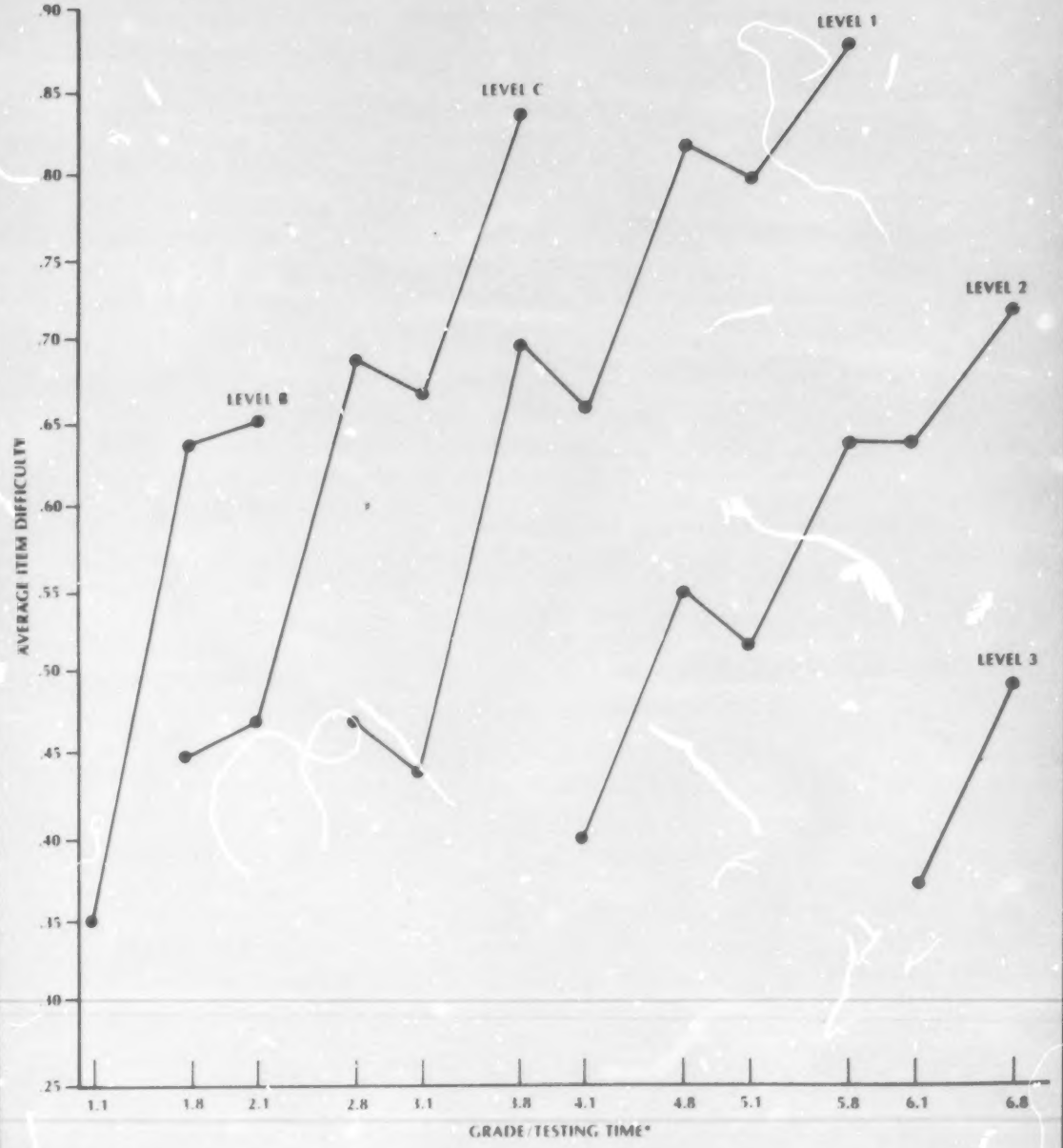


Figure 1-10. Average Item Difficulty as a Function of Grade Level – Unbiased CTBS Math Scales
*g.1 indicates test administration in fall (September-October), and g.8 indicates test administration in spring (April-May).

same for all students in a grade cohort. Subcohorts were therefore formed within each grade cohort by classifying the schools in terms of the sequence of test levels that was administered and recommended. Three or four subcohorts were identified for each grade except grade 6, which had only one sequence of tests administered and recommended. Test-retest correlations were then computed for each of the subcohorts. In this way, a range of test-retest correlations is obtained for the various test-level combinations. The range contains the appropriate values to be considered as the correction factors for unreliabilities when the ANCOVA model is applied to the test data. These test-retest correlations obtained with the VSSs are regarded as estimates of test-retest reliabilities, although alternate test levels are often involved.

There are five grade cohorts (1-2, 2-3, 3-4, 4-5, and 5-6) that have complete data from all three testings. For the 6th graders in Year 1, there are no test scores available in fall, 1977, because the present study does not collect data beyond the 6th grade. Because only one test level was recommended by SDC in the fall testing for each of the grades 1, 4, and 6 of all schools, a total of 25 cohort/test sequence combinations is possible. Among them, six involve test sequences that have reversed orders of the test levels (i.e., a higher test level was used for an earlier test administration). Generally, there are very few schools (from none to less than 5) in these categories. Additionally, for the grade cohort 2-3, test sequences BC1, and B11 are applicable to 5, and 4 schools, respectively, and therefore do not have sufficient data for the analyses. For these reasons, 8 of the 25 cohort/test sequence combinations were eliminated from the computations of test-retest correlations. Within each of the remaining 17 combinations, a random sample of 600 was selected from the 94 representative schools that continued to participate in the second study year. Test scores of the three administrations for these random samples were obtained and all three test-retest correlations were calculated with cases having incomplete data deleted. When there were less than 600 students in the second-year representative schools for a cohort/test sequence combination, all available data were included in the computations.

The results are presented in Table 1-15 by grade cohort and by test sequence within a cohort for the debiased reading, math, and debiased basic skill total scores. The data show that the test-retest (alternate-level) reliability estimates are generally higher at the upper three grades. As in the case of internal consistencies, the test-retest reliabilities are somewhat lower for the math tests than for the reading tests with few exceptions. The average estimates of reliability across test sequences for each grade cohort were also obtained via Fisher's Z transformation. As shown in the table, test-retest correlations computed using the spring, Year 1 and fall, Year 2 data are higher than those for the other two time intervals. This finding probably reflects the shorter length of time between these two test administrations and the frequent involvement of the same test level at the two testings. However, the correlation between the two fall testings are comparable to those between the fall and spring testings within a school year.

Intercorrelations Between Reading and Math Achievement. Table 1-16 presents the correlations among the debiased reading, math, and the debiased basic skill total scores. The correlations were computed for both raw scores and vertical scale scores on the basis of 500 randomly selected cases for each grade. Intercorrelations are presented for the at-level and the below-level tests. The debiased reading and math scores are moderately correlated,

Table 1-15

Test-Retest Reliabilities for the Debiased CTBS Scales – Vertical Scale Score

Grade Cohort	Test Sequence	N	Skill Area								
			Reading			Math			Basic Skills		
			F1-S1*	S1-F2	F1-S2	F1-S1	S1-F2	F1-F2	F1-S1	S1-F2	F1-F2
1-2	ABB	590	.63	.79	.62	.60	.71	.63	.69	.82	.70
	ABC	595	.63	.76	.61	.66	.67	.64	.73	.78	.70
	ACC	600	.53	.83	.53	.60	.71	.58	.67	.85	.66
	Average		.59	.80	.59	.62	.70	.61	.69	.82	.69
2-3	BCC	582	.75	.86	.77	.65	.75	.67	.78	.86	.80
	CCC	423	.75	.84	.74	.63	.76	.68	.78	.86	.79
	CC1	194	.73	.80	.79	.68	.72	.71	.79	.82	.83
	C11	595	.80	.86	.79	.70	.74	.73	.82	.86	.80
	Average		.76	.84	.77	.67	.74	.70	.79	.85	.81
3-4	CC1	586	.77	.78	.80	.64	.69	.68	.77	.81	.80
	C11	319	.82	.91	.84	.74	.86	.73	.83	.92	.85
	111	592	.84	.88	.81	.74	.80	.75	.86	.89	.83
	Average		.81	.87	.82	.71	.79	.72	.82	.88	.83
4-5	111	573	.76	.83	.79	.74	.82	.77	.81	.88	.84
	112	590	.83	.83	.84	.72	.74	.73	.85	.85	.85
	122	598	.84	.89	.86	.72	.81	.74	.85	.90	.86
	Average		.81	.85	.83	.73	.79	.75	.84	.88	.85
5-6	112	584	.90	.88	.89	.82	.78	.77	.91	.90	.89
	122	426	.85	.90	.87	.73	.81	.76	.86	.90	.87
	222	598	.89	.91	.88	.76	.82	.77	.87	.91	.88
	Average		.88	.90	.88	.77	.81	.77	.88	.90	.88
6	22-	596	.89	N/A	N/A	.80	N/A	N/A	.89	N/A	N/A

*F1, S1, and F2 represent the three test administrations: Fall 1976, spring 1977, and fall 1977, respectively.

ranging from .45 to .77. When a test level is somewhat difficult for a grade, the correlations tend to be lower than those for another test level, as in the case of the level B test for grade 1 in the fall. The high correlations for the basic skill scores with reading and math scores are expected since they represent correlations between the parts and the total.

Table 1-16

Intercorrelations Between the Debiased CTBS Reading and Math Scales Based on Raw Scores (Above Diagonal) and Vertical Scale Scores (Below Diagonal)

Grade		Test Administration											
		Fall (September-October)						Spring (April-May)					
		Level A			Level B			Level B			Level C		
		R	M	T*	R	M	T	R	M	T	R	M	T
1	R	–	.65	.97	–	.48	.87	–	.66	.92	–	.58	.94
N=500	M	.66	–	.82	.45	–	.85	.65	–	.90	.59	–	.82
	T	.95	.84	–	.85	.85	–	.90	.90	–	.92	.85	–
		Level B			Level C			Level C			Level 1		
		R	M	T	R	M	T	R	M	T	R	M	T
2	R	–	.60	.90	–	.60	.95	–	.63	.93	–	.71	.94
N=500	M	.61	–	.89	.59	–	.83	.67	–	.87	.68	–	.90
	T	.87	.90	–	.92	.83	–	.92	.90	–	.92	.90	–
		Level C			Level 1			Level C			Level 1		
		R	M	T	R	M	T	R	M	T	R	M	T
3	R	–	.63	.93	–	.71	.95	–	.55	.92	–	.71	.94
N=500	M	.64	–	.87	.70	–	.90	.56	–	.83	.71	–	.90
	T	.90	.90	–	.93	.90	–	.91	.83	–	.93	.91	–
		Level 1			Level 2			Level 1			Level 2		
		R	M	T	R	M	T	R	M	T	R	M	T
4	R	–	.69	.94	–	.59	.94	–	.74	.95	–	.67	.94
N=500	M	.69	–	.90	.57	–	.83	.74	–	.91	.66	–	.89
	T	.93	.90	–	.93	.83	–	.96	.89	–	.93	.89	–
		Level 1			Level 2			Level 1			Level 2		
		R	M	T	R	M	T	R	M	T	R	M	T
5	R	–	.77	.96	–	.70	.94	–	.75	.96	–	.74	.95
N=500	M	.75	–	.92	.69	–	.90	.76	–	.90	.72	–	.91
	T	.95	.90	–	.94	.89	–	.96	.90	–	.94	.90	–
		Level 2			Level 3			Level 2			Level 3		
		R	M	T	R	M	T	R	M	T	R	M	T
6	R	–	.70	.95	–	.65	.95	–	.71	.95	–	.74	.94
N=500	M	.71	–	.89	.64	–	.86	.71	–	.90	.74	–	.92
	T	.94	.90	–	.94	.85	–	.94	.90	–	.94	.92	–

*R-Reading; M-Math; T-Combined Total of Reading and Math, called Basic Skills Total in the text.

RELATIONS OF ACHIEVEMENT SCORES TO OTHER STUDENT-LEVEL MEASURES

In addition to the measures of basic skills achievement described in the previous sections, measures of each student's practical achievement (functional literacy) and attitude towards learning and school (student affect) were also obtained in the SES to provide supplemental data for describing educational development. These two measures (PAS and SAM) are described in Chapter 2 of this report. In this section, intercorrelations among the achievement and attitudinal scores collected at the outset of the study (fall, 1976) are examined. Because the attitudinal scores were not obtained for the first graders in the fall (see Chapter 2 for an explanation), it was decided to use the spring attitudinal scores in the analysis for grade 1. The practical achievement measure is appropriate only for grades 4, 5, and 6, and thus is omitted in the analyses involving grades 1, 2, and 3.

Educational and sociological evaluators have long been interested in the relationship between achievement and student background characteristics. In the Student Background Checklist (SBC, see Chapter 4), each student's teacher was asked to provide information on the student's ethnic status, and the educational attainment of the parents. The teacher was also asked to report whether the student participated in the school's free or reduced-price lunch program. The free-lunch participation and the parents' educational attainment were to be considered as indicators of family socioeconomic status. Achievement is generally thought to be closely associated with these background characteristics. To describe such relationships, the correlations of students' achievement and attitudinal scores with their majority/minority status and free-lunch participation are presented in the first part of this section. Then the achievement scores are examined in terms of subgroup means for students of various backgrounds. Since there is some concern about the differential effects of a test level (which reflects the difficulty of the test) on the performance of students from different backgrounds or with different achievement status (see, for example, Haertel and Wiley, 1978), the last part of this section addresses the issue by comparing test scores obtained with different test levels for a random sample of students by several student characteristics. The analyses for this section were based on a sample of 500 cases per grade, randomly selected from the 242 representative schools.

Intercorrelations Between Measures of Educational Development and Student Background Characteristics. Table 1-17 presents the correlations among reading achievement scores, math achievement scores, practical achievement scores, attitude scores (student affect), majority/minority status, and free-lunch participation, by grades. The Vertical Scale Scores of the at-level CTBS tests administered in Fall, 1976, were used as the reading and math achievement scores. At that same period, the practical achievement scores for grades 4, 5, and 6, and the attitude scores for grades 2 to 6 were obtained, but the attitude scores for grade 1 were not collected until the spring of 1977. All students who were not classified as non-Hispanic White/Caucasian were considered as minority members for the present analyses. The free-lunch participation records were taken directly from the teacher's report in SBC. The correlations for grades 1, 3, and 5 are given in the above-diagonal entries of the correlation matrices, while those for grades 2, 4, and 6 are given in the below-diagonal entries. All computations were based on a random sample of 500 per grade, with missing data deleted.

Table 1-17

Correlations of Achievement and Attitudinal Measures with Student Background Characteristics*

Student Measures**	RAV	MAV	PAS	SAM	RWM	FLP
Correlation Matrix for Grade 1 (Above Diagonal) and Grade 2 (Below Diagonal)						
Reading Achievement (RAV)	–	.45	N/A	.02	.08	−.15
Math Achievement (MAV)	.59	–	N/A	−.04	.14	−.17
Practical Achievement (PAS)	N/A	N/A	–	N/A	N/A	NA
Attitude Score (SAM)	−.04	.00	N/A	–	−.20	.12
White/Minority (RWM)	.33	.28	N/A	−.12	–	−.44
Free Lunch (FLP)	−.41	−.32	N/A	.16	−.41	–
Correlation Matrix for Grade 3 (Above Diagonal) and Grade 4 (Below Diagonal)						
Reading Achievement (RAV)	–	.70	N/A	−.12	.38	−.39
Math Achievement (MAV)	.57	–	N/A	−.09	.32	−.37
Practical Achievement (PAS)	.66	.66	–	N/A	N/A	N/A
Attitude Score (SAM)	−.10	.02	−.05	–	−.25	.23
White/Minority (RWM	.28	.26	.31	−.13	–	−.53
Free Lunch (FLP)	−.35	−.24	−.34	.14	−.45	–
Correlation Matrix for Grade 5 (Above Diagonal) and Grade 6 (Below Diagonal)						
Reading Achievement (RAV)	–	.69	.74	−.05	.34	−.42
Math Achievement (MAV)	.64	–	.73	.09	.24	−.33
Practical Achievement (PAS)	.69	.64	–	.04	.28	−.38
Attitude Score (SAM)	−.01	.05	.02	–	−.21	.18
White/Minority (RWM)	.30	.24	.36	−.21	–	−.43
Free Lunch (FLP)	−.36	−.34	−.38	.07	−.45	–

*Achievement and Attitudinal Measures were collected in fall, 1976. For Grade 1, spring collection of Student Affective Measure (SAM) was used. Practical Achievement Scale (PAS) was administered to Grades 4, 5, and 6 only. Sample size is 500 per grade. Missing data were eliminated from computations.

**RAV = At-level CTBS reading score (Vertical Scale Score)
MAV = At-level CTBS math score (Vertical Scale Score)
RWM = Race/ethnicity (Non-Hispanic Caucasian/White = 1; Others = 0)
FLP = Free-lunch participation (participant = 1; non-participant = 0).

Inspection of the table reveals similar results for the six grades. When achievement scores are involved, the correlations for grade 1 tend to be lower than the corresponding correlations

for the other five grades. A possible explanation for the lower correlations at grade 1 is that the achievement measures are less reliable at such an early stage of schooling (see the preceding section). It is interesting to note that the correlations of practical achievement with reading and math scores, which range from .64 to .74, are slightly higher than those between reading and math scores for the same grade. The practical achievement score is expected to correlate substantially with the basic skills achievement scores as the test requires both reading and math skills to answer the items.

Attitude scores correlate negligibly and often negatively (ranging from −.12 to .09) with the three achievement measures.

The negative or small correlations were also obtained previously in other studies (e.g., Trismen, *et al.*, 1975). Another observation worth noting is that the attitude scores are negatively but not highly (ranging from −.25 to −.12) correlated with majority/minority status. This finding indicates that the minority students tend to score higher in the Student Affective Measure and possibly reflects a slight tendency for the minority-students to respond to attitude scales in a socially desirable manner.

The correlations between student majority/minority status and the achievement scores are positive and moderate in grades 2 to 6, ranging between .24 and .38. Due to the dichotomous nature of the majority/minority status, these results show that, on the average, majority students scored higher in the achievement tests than did the minority students. The correlations of free-lunch participation with the achievement scores are negative, ranging from −.15 with reading at grade 1 to −.42 with reading at grade 5. These negative correlations indicate that students who participated in free-lunch programs tend to obtain lower achievement scores than do the non-participants. Finally, it is noted that majority/minority status and participation in free or reduced-price lunch programs are intercorrelated negatively and substantially (in the negative 40's and 50's).

Basic Skill Achievement and Student Background Characteristics. In the preceding section, the relationsips of educational measures with ethnic status, and participation in free-lunch programs (used as a proxy of the student family economic status) were described in terms of their inter-correlations. We now further examine the relationships between achievement and student background characteristics by comparing the average achievement scores for different groups of students. The analyses were based on the same randomly selected samples employed earlier in the calculation of correlations.

The means and standard deviations of the at-level CTBS vertical scale scores are displayed in Table 1-18, separately by participation in free-lunch programs, and by ethnic status, each dichotomized into two categories. Achievement scores obtained in both Fall, 1976 and Spring, 1977 were analyzed. Except for the reading score at grade 1, fall testing, statistical tests show significant differences at the .01 level between the group means of majority and minority students in both skill areas and both test administrations for all grades. Dichotomized with respect to participation in free-lunch programs, the results are consistent. For all cases examined, the two groups differ significantly at the .01 level in that the means for the non-participants are higher than for the participants.

Table 1-18

Basic Skill Achievement (At-Level Vertical Scale Scores) in Relation to Student's Free-Lunch Participation and Race/Ethnicity*

Grade		Reading				Math			
		Free-Lunch		Race/Ethnicity		Free-Lunch		Race/Ethnicity	
		Participant	Non-Participant	Caucasion/ White	Minorty	Participant	Non-Participant	Caucasion/ White	Minorty
Grade 1	N	195	304	355	144	195	304	355	144
Fall	Mean	338.71	349.41	347.03	340.80	324.94	337.19	335.45	324.90
	S.D.	31.86	37.53	35.65	35.82	32.42	35.35	34.77	33.57
Spring	Mean	383.82	418.60	413.00	385.31	378.75	398.07	396.37	376.08
	S.D.	41.09	46.74	48.77	38.54	43.05	41.32	42.02	42.15
Grade 2	N	195	304	369	130	195	304	369	130
Fall	Mean	394.26	437.30	430.60	391.75	375.93	404.41	400.65	372.36
	S.D.	39.72	51.46	50.03	45.10	39.02	42.86	42.29	40.65
Spring	Mean	440.93	479.93	473.87	438.65	429.60	460.16	456.85	423.70
	S.D.	42.38	51.59	50.15	47.48	45.61	44.62	45.52	43.98
Grade 3	N	194	305	355	144	194	305	355	144
Fall	Mean	434.06	478.64	474.74	428.19	416.24	454.29	449.72	414.30
	S.D.	49.43	53.01	53.47	47.83	45.31	46.73	47.91	45.08
Spring	Mean	465.85	522.09	515.41	462.78	485.20	524.29	520.65	480.58
	S.D.	53.97	56.62	59.28	51.81	53.68	58.33	58.00	53.96
Grade 4	N	168	329	381	116	168	329	381	116
Fall	Mean	471.55	510.96	505.89	470.55	474.46	500.35	498.90	467.61
	S.D.	45.31	52.14	53.52	42.51	42.37	53.94	51.48	45.16
Spring	Mean	494.03	541.21	534.35	495.41	520.48	559.47	555.88	514.77
	S.D.	53.47	57.63	60.26	51.02	62.21	66.11	65.05	65.30
Grade 5	N	170	329	394	105	170	329	394	105
Fall	Mean	495.42	552.47	544.42	490.33	516.06	562.50	555.01	515.42
	S.D.	55.70	60.35	62.26	55.27	58.48	66.12	66.58	60.59
Spring	Mean	519.76	579.72	571.08	515.08	563.95	611.35	602.57	567.54
	S.D.	60.39	64.31	66.92	58.49	64.26	70.70	72.21	64.91
Grade 6	N	160	339	381	118	160	339	381	118
Fall	Mean	519.76	573.00	567.44	518.75	549.03	597.72	591.19	552.78
	S.D.	65.03	65.29	67.34	64.32	59.36	64.81	66.63	59.76
Spring	Mean	549.29	603.36	596.23	553.08	597.29	653.75	648.06	595.58
	S.D.	66.39	68.57	71.41	65.54	77.55	78.02	79.02	79.51

*One-way ANOVA's indicate significant differences at .01 level between the group means of free-lunch participants and non-participants for all 24 skill area/grade/testing time combinations. Differences between the group means of white and minority students are also significant at .01 level with an exception in reading score at grade 1, fall testing.

In response to the recent interest in relating a parent's educational attainent to a child's achievement, Table 1-19 presents the results of the analyses in terms of parental educational levels. Parents' educational attainment was estimated in the SBC by the student's teacher and divided into three categories for the present analyses. The categories are: less than high school, high school graduates but no college degree, and college graduates. All statistical tests performed in the one-way ANOVAs indicate significant differences at the .01 level. In all grades, the group means for both reading and math — and at both testings — increase consistently with the mother's educational level. These findings also apply to the analyses using the father's educational level as the grouping factor.

As an exploratory analysis, the achievement scores were also compared among groups of students with different CE selection status. Student CE selection status was determined on the basis of records obtained from the Compensatory Education Roster (CER, see Chapter 3). Table 1-20 gives the means and standard deviations for the Title I selectees, Other CE seletees, and non-selectees. The data show that non-selectees clearly have higher averages than do the other two groups. Title I selectees, on the other hand, tend to have the lowest means. Indeed, these results merely reflect the policy of the CE programs to serve low-achieving students. The mean differences among the three groups were significant at the .01 level except for the fall math scores in grade 1. It should be emphasized, however, that these data provide no direct information about the effectiveness of CE and any careless inferences drawn in that regard on the basis of these data alone are inappropriate. In passing, it may be noted that one reason for presenting Tables 1-18 to 1-20 was to provide references for the discussion in the next section that deals with the relation between test-level effects and student characteristics.

Test Level Effects and Student Characteristics. In order to address the concern that the appropriateness of a test level to the examinees may affect their scores and thereby bias the comparisons among groups if the test level employed is not equally appropriate for the groups, the discrepancies between the test scores obtained with the two different test levels administered in the first study year are examined for groups of students with different characteristics. Typically, one suspects that if a test level is too difficult for the students, they may be so frustrated that they will not respond or will engage in random guessing. Therefore, the score obtained will be unreliable and, more important, invalid. On the other hand, if the test is too easy, there may be unreliability and invalidity because of careless responses caused by boredom. Even if the students respond carefully, the ceiling effects alone could severely deflate the scores. It is likely that a particular test level is inappropriate for the majority of some identifiable group of students with specific characteristics and thus, if used, would introduce bias against the group in the comparisons of their achievement with that of other groups. Another possibility is that the derivation of the VSSs on the basis of the projected population data may not be equally accurate along the score continuum and, consequently, may bias (inflate or deflate) the differences if scores for groups that are quite apart in the score distributions are to be compared. Also, the differences in the shape of score distributions among different groups may invalidate the equating results of the tests when used in subpopulations. For these reasons, it is important that we provide some data regarding the differential effects that test levels may have on students of different characteristics.

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Table 1-19

Basic Skill Achievement (At-Level Vertical Scale Scores) and Educational Attainment of Student's Parent*

		Reading						Math					
		Mother's Education**			Father's Education			Mother's Education			Father's Education		
		HS⁻	HS⁺	COL⁻	HS⁻	HS⁺	COL⁺	HS⁻	HS⁺	COL⁺	HS⁻	HS⁺	COL⁺
Grade 1	N	84	248	38	75	202	48	84	248	38	75	202	48
	Mean	336.49	348.71	360.71	342.03	348.62	363.77	315.35	338.91	345.55	317.35	340.02	346.67
Fall	S.D.	31.25	39.54	38.35	32.62	38.65	44.73	37.69	33.74	41.80	34.68	32.50	43.14
	Mean	376.89	414.12	439.92	379.56	415.87	440.63	369.08	395.67	416.32	375.33	394.96	416.52
Spring	S.D.	32.77	47.70	47.39	35.06	47.49	52.40	37.[illegible]	42.07	41.28	38.81	43.13	36.86
Grade 2	N	90	267	20	72	210	44	90	267	20	72	210	44
	Mean	395.81	428.61	482.50	395.46	428.69	455.36	376.88	398.96	428.60	381.01	397.09	420.09
Fall	S.D.	46.24	48.49	35.14	51.15	46.40	49.72	35.90	45.10	31.32	42.24	43.00	36.71
	Mean	445.26	471.33	526.10	444.25	473.20	500.00	436.21	453.34	485.65	435.28	454.31	472.25
Spring	S.D.	43.57	51.37	39.51	47.19	48.91	44.75	41.80	46.89	40.25	43.75	46.39	41.86
Grade 3	N	96	225	44	86	189	56	96	225	44	86	189	56
	Mean	435.60	471.15	510.30	445.37	469.66	512.80	415.97	446.76	483.52	426.56	446.98	480.38
Fall	S.D.	47.13	51.90	57.36	51.93	52.69	46.99	46.04	44.66	55.38	45.73	42.06	50.98
	Mean	463.67	512.18	553.14	470.41	512.72	556.46	483.21	517.93	547.34	489.73	517.56	554.30
Spring	S.D.	55.75	56.85	67.94	63.67	54.11	56.72	53.04	61.42	61.17	59.45	57.50	55.80
Grade 4	N	83	257	39	87	198	57	83	257	39	87	198	57
	Mean	468.83	502.16	546.23	469.33	506.74	542.86	478.49	490.50	534.49	474.89	495.51	524.89
Fall	S.D.	44.53	49.28	45.46	44.85	48.26	43.38	40.84	53.09	42.95	39.22	53.79	49.12
	Mean	496.84	529.84	579.79	497.72	533.90	578.19	525.72	548.74	585.74	520.90	552.69	591.77
Spring	S.D.	48.34	56.47	49.46	45.76	53.92	53.52	60.39	67.50	61.93	63.00	64.24	61.89
Grade 5	N	98	257	41	92	209	56	98	257	41	92	209	56
	Mean	498.86	543.79	586.98	501.88	545.00	581.96	518.58	554.05	589.12	530.80	551.15	591.79
Fall	S.D.	55.91	62.18	59.97	52.50	59.52	67.02	58.95	69.05	62.85	65.75	62.44	69.22
	Mean	521.04	571.09	624.29	524.18	571.16	618.98	571.00	602.32	634.59	572.90	600.68	639.05
Spring	S.D.	62.96	63.46	64.96	60.94	61.63	70.78	71.32	72.39	69.49	74.01	65.95	75.89
Grade 6	N	85	252	43	76	222	64	85	252	43	76	222	64
	Mean	522.15	563.69	617.63	517.29	563.74	620.27	549.87	589.85	648.49	536.87	589.78	640.41
Fall	S.D.	64.99	68.34	48.04	57.01	65.18	55.33	56.75	64.47	56.38	51.59	62.19	61.46
	Mean	551.35	592.90	658.07	540.37	595.03	656.36	594.19	646.08	720.93	585.78	645.13	707.70
Spring	S.D.	65.36	69.02	55.27	64.48	62.85	61.92	73.21	77.20	67.89	66.49	75.83	71.99

*One-Way ANOVAs indicate significant differences at .01 level among group means for all cases.

Table 1-20

Basic Skill Achievement (At-Level Vertical Scale Scores) and Student's CE Selection Status*

Grade		Reading			Math		
		Title I Selectees	Other-CE Selectees	Non-Selectees	Title I Selectees	Other-CE Selectees	Non-Selectees
Grade 1	N	57	66	377	24	48	428
	Mean	339.63	334.74	347.88	320.13	326.98	333.71
Fall	S.D.	22.99	30.55	37.74	25.72	35.22	34.94
	Mean	375.61	394.58	411.16	370.13	375.02	39[illegible]31
Spring	S.D.	33.51	49.27	47.37	46.40	41.02	42.44
Grade 2	N	72	66	362	36	43	421
	Mean	381.46	402.33	431.75	365.50	377.79	397.46
Fall	S.D.	32.63	43.52	51.51	44.40	34.80	43.42
	Mean	426.63	446.18	475.96	412.03	433.14	452.98
Spring	S.D.	33.03	43.08	52.05	48.11	38.32	46.58
Grade 3	N	89	56	355	39	39	422
Fall	Mean	417.51	425.84	477.68	393.38	417.74	445.61
	S.D.	36.79	54.32	51.77	36.37	44.91	48.55
	Mean	453.19	463.09	517.72	462.44	490.26	514.87
Spring	S.D.	44.46	53.79	58.18	40.25	59.05	59.25
Grade 4	N	78	46	376	40	46	414
	Mean	457.69	473.22	508.39	467.18	481.24	494.99
Fall	S.D.	38.83	52.68	51.24	39.53	54.52	51.72
	Mean	476.64	498.96	538.22	514.83	517.46	552.29
Spring	S.D.	45.68	58.13	57.24	56.13	67.44	66.64
Grade 5	N	56	54	390	28	47	425
	Mean	474.55	499.02	545.87	500.36	505.55	554.10
Fall	S.D.	47.46	62.64	60.94	40.12	71.07	65.52
	Mean	504.25	522.48	572.19	543.25	559.64	602.27
Spring	S.D.	46.86	71.81	65.63	58.45	72.83	70.57
Grade 6	N	34	37	429	16	32	452
	Mean	491.85	517.76	564.08	545.25	555.09	585.14
Fall	S.D.	48.25	58.47	68.50	49.48	57.45	67.53
	Mean	512.24	548.22	594.68	593.44	598.81	639.44
Spring	S.D.	44.34	61.88	70.80	61.65	81.12	82.10

*One-way ANOVA's show that the group means for the three CE selection categories differ significantly at .01 level in 23 cases of the 24 skill area/grade/testing time combinations. The only exception was found for the case of math/grade 1/fall testing.

Note.—These data are not presented as estimates of program effects; differences between groups have not been adjusted in any way to gauge program effects accurately

Earlier we found that the achievement scores generally differ between groups of students of different races, different economic status, and whose parents have different educational levels. Accordingly, Tables 1-21 and 1-22 present data on test-level effects for subgroups of students classified in terms of these characteristics so that the extent that the achievement difference between the groups varies with test levels can be gauged. The test-level effects were assessed in terms of the discrepancies between the VSSs obtained with the two test levels by

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Table 1-21

Test-Level Effects (At-Level VSS Minus Below-Level VSS) in Relation to Student Free-Lunch Participation and Race/Ethnicity

Grade		Reading				Math			
		Free-Lunch		Race/Ethnicity		Free-Lunch		Race/Ethnicity	
		Participant	Non-Participant	Caucasian/ White	Minority	Participant	Non-Participant	Caucasian/ White	Minority
Grade 1	N	195	304	355	144	195	304	355	144
Fall	Mean	7.96	−3.64	−4.15	13.33	3.91	−2.07	−2.02	5.92
	S.D.	35.40	38.15	36.56	36.98	32.17	29.04	29.78	31.31
Spring	Mean	−4.45	−2.15	−1.59	−6.63	4.51	−1.90	.42	1.04
	S.D.	32.82	29.42	29.18	34.27	30.81	28.24	27.34	34.07
Grade 2	N	195	304	369	130	195	304	369	130
Fall	Mean	−3.51	6.19	4.39	−3.26	−1.43	−1.82	−1.70	−1.57
	S.D	30.54	30.01	29.71	32.29	31.34	28.53	27.76	34.51
Spring	Mean	5.09	−.73	.62	4.16	−.70	−5.55	−3.23	−4.85
Spring	S.D.	36.65	32.07	32.07	39.03	30.76	27.35	28.30	30.24
Grade 3	N	194	305	355	144	194	305	355	144
Fall	Mean	.26	−5.41	−4.46	−.11	−11.46	−8.39	−9.97	−8.64
	S.D.	32.16	32.74	31.39	35.34	34.62	28.97	29.23	35.96
Spring	Mean	2.82	15.84	13.85	3.19	12.72	26.74	24.62	13.08
	S.D.	32.98	42.30	40.81	34.76	36.71	38.25	39.46	33.77
Grade 4	N	168	329	381	116	168	329	381	116
Fall	Mean	2.15	−4.24	−3.58	2.85	2.27	−10.04	−7.42	−.81
	S.D.	34.03	29.82	30.07	35.17	35.35	36.29	37.00	34.09
Spring	Mean	−6.59	−5.97	−6.40	−5.46	−3.12	−3.49	−2.65	−5.72
	S.D.	29.06	29.24	29.12	29.35	41.33	40.87	40.27	43.36
Grade 5	N	170	329	394	105	170	329	394	105
Fall	Mean	−1.29	.19	.34	−2.77	−.19	.08	.03	−.16
	S.D.	31.42	30.79	30.53	32.68	36.42	38.36	37.38	38.96
Spring	Mean	−1.37	.59	1.14	−4.67	18.74	23.85	21.38	24.86
	S.D.	34.08	36.73	35.88	35.43	36.90	46.55	45.75	34.00
Grade 6	N	160	339	381	118	160	339	381	118
Fall	Mean	−3.98	−8.22	−8.63	−1.16	−5.87	−7.08	−8.35	−1.36
	S.D.	36.39	34.99	35.04	36.38	45.59	44.41	44.86	44.14
Spring	Mean	1.14	−3.67	−5.05	7.32	.36	9.40	8.92	−1.33
	S.D.	35.19	31.94	32.77	32.37	45.11	39.81	39.98	46.24

subtracting the below-level score from the at-level score. Detailed examinations of the tables reveal no consistent results across the grades. Inspection of Table 1-21 shows that the average between-level discrepancies in the VSSs (test-level effects) do not differ drastically between free-lunch non-participants and participants in most cases. The differences in test-level effects between the two groups are generally small in comparison with their differences in the average at-level VSS. Consequently, if below-level tests are used, the group differences in achievement scores found earlier remain significant, although the magnitude of differences may change. A few cases where substantial differences in test-level effects exist between the groups are further examined here to illustrate how the use of different test levels may alter the group differences. In reading, particularly noticeable between-group differences in test-level effects are found for grade 1/fall, grade 2/fall, and grade 3/spring. Referring to Table 1-18, the mean difference in the at-level VSS between free-lunch non-participants and participants is 522.09 − 465.85 = 56.24 for grade 3/spring, while Table 1-21 indicates a difference of 15.84 − 2.82 = 13.02 in test-level effects between the groups. Because test-level effects are defined as the at-level VSS minus the below-level VSS, a difference of 43.22 (56.24 − 13.02) in the average below-level VSS may be deduced from the data cited above. Similarly, for grade 1/fall, a difference of 22.30 in the average below-level VSS is obtained, whereas the corresponding difference with the at-level test is 10.70, as obtained from Table 1-18. For grade 2/fall, the mean differences between the groups are found to be 43.04 and 33.34 with at-level and below-level tests, respectively. These data show that the group differences in average achievement scores remain substantial regardless of which test level is used. In fact, for grade 1/fall, the difference is enhanced if the comparison is based on the below-level test (level A) instead of the at-level test (level B). In math, substantial differences in test-level effects between the two free-lunch participation groups are found for grade 3/spring, grade 4/fall, and grade 6/spring. Following the same procedure explained above, data contained in Tables 1-18 and 1-21 show the following group mean differences:

Grade	At-Level Test	Below-Level Test
Grade 3/spring	39.09	25.07
Grade 4/fall	25.89	38.20
Grade 6/spring	56.46	47.42

Thus, the group differences are substantial, irrespective of the test level involved.

With respect to ethnic status, group differences in test scores with at-level and below-level tests for cases where differential test-level effects are particularly noticeable are summarized below:

Grade	Average for Caucasian/Whites Minus Average for Minorities	
	At-Level Test	Below-Level Test
	Reading	
Grade 1/fall	[illegible].23	23.71
Grade 3/spring	52.63	41.97
Grade 6/spring	43.15	55.52
	Math	
Grade 3/spring	40.07	28.53
Grade 6/spring	52.48	42.23

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Table 1-22

Test-Level Effects (At-Level VSS Minus Below-Level VSS) and Educational Attainment of Student's Parent

		Reading						Math					
		Mother's Education*			Father's Education			Mother's Education			Father's Education		
		HS⁻	HS⁺	COL⁺	HS⁻	HS⁺	COL⁺	HS⁻	HS⁺	COL⁺	HS⁻	HS⁺	COL⁺
Grade 1 Fall	N	84	248	38	75	202	48	84	248	38	75	202	48
	Mean	9.98	−4.01	2.16	14.63	−4.38	−2.46	−2.14	.67	−5.55	−1.20	1.08	−2.96
	S.D.	33.69	38.47	44.84	33.68	38.66	41.71	34.90	28.92	28.95	36.11	28.41	31.49
Spring	Mean	−5.76	−3.26	6.53	−6.43	−3.41	5.10	2.89	−2.53	3.50	2.91	−3.12	4.00
	S.D.	31.11	30.23	22.95	30.81	29.54	26.29	30.85	28.62	20.39	29.52	29.70	23.51
Grade 2 Fall	N	90	267	20	72	210	44	90	267	20	72	210	44
	Mean	−6.46	4.51	20.25	−4.36	5.11	7.25	−2.62	−1.27	7.40	−.10	−2.76	5.89
	S.D.	29.94	28.55	36.31	35.21	28.26	30.14	31.69	29.01	22.23	33.12	29.88	25.38
Spring	Mean	−4.63	2.02	8.25	2.56	.50	3.16	.02	−3.22	−6.20	−.56	−2.69	−4.50
	S.D.	34.96	34.51	30.92	34.11	34.21	31.67	28.40	28.05	26.92	24.76	28.40	23.04
Grade 3 Fall	N	96	225	44	86	189	56	96	225	44	86	189	56
	Mean	121	−4.13	7.02	2.81	−3.95	5.32	−16.50	−8.28	−1.11	−10.27	−8.51	−6.05
	S.D.	31.18	31.74	33.39	32.05	31.75	30.31	31.70	30.45	30.59	30.41	28.34	28.77
Spring	Mean	1.53	10.97	35.05	3.08	11.62	34.39	15.39	24.91	37.73	16.77	23.30	44.29
	S.D.	36.26	38.33	59.41	40.56	35.65	56.48	37.99	39.38	48.02	40.19	37.82	42.92
Grade 4 Fall	N	83	257	39	87	198	57	83	257	39	87	198	57
	Mean	−1.46	−.55	−6.26	1.85	.82	−4.47	−2.66	−7.04	−.62	1.03	−5.31	−13.58
	S.D.	34.00	30.58	25.99	35.80	27.75	23.10	35.16	37.89	29.43	34.02	37.38	36.62
Spring	Mean	−2.94	−5.04	−5.85	−3.34	−4.05	−2.67	−7.04	−.73	−1.46	−5.40	.59	−2.63
	S.D.	29.30	28.34	31.19	27.25	26.32	33.73	39.70	39.60	48.40	33.89	41.83	51.89
Grade 5 Fall	N	98	257	41	92	209	56	98	257	41	92	209	56
	Mean	2.17	.35	−3.29	1.38	2.66	−6.02	−4.13	.63	.49	2.61	−3.76	7.14
	S.D.	31.78	26.69	39.50	30.15	29.98	36.29	37.81	37.91	34.23	37.05	37.99	37.66
Spring	Mean	−.03	.42	18.95	−1.34	.03	20.46	26.52	21.10	31.12	22.64	18.76	38.86
	S.D.	37.50	35.71	46.10	35.04	35.68	40.91	40.66	42.99	46.96	38.73	41.55	51.99
Grade 6 Fall	N	85	252	43	76	222	64	85	252	43	76	222	64
	Mean	−3.85	−8.40	−8.14	1.12	−8.39	−8.27	−1.05	−7.94	−.56	−8.78	−5.54	−7.05
	S.D.	38.36	34.91	29.65	35.28	34.85	35.31	52.44	41.75	43.68	46.74	44.21	43.21
Spring	Mean	−.65	−3.83	−.14	−4.37	−3.24	3.53	−.88	9.24	17.37	−2.36	8.06	15.38
	S.D.	35.16	33.36	32.12	34.65	32.84	35.11	46.69	40.82	32.64	42.98	41.44	35.67

*HS⁻ = Less than high school; HS⁺ = High school graduate and possibly some college; COL⁺ = College graduate

The group differences in achievement scores are substantial for both test levels except for grade 1/fall, where the at-level differences are small, but the use of below-level scores increases the differences.

In summary, differential results in group comparisons with alternate test levels are found for some cases with respect to the magnitude of differences, but the direction and significance of the group differences mostly remain unchanged. Some similar results were also obtained in other studies (see Haertel and Wiley, 1978). The interested reader who would like to study in more detail the changes in group differences if the below-level tests were used instead of the at-level tests may infer the means for the below-level test scores from Tables 1-18 and 1-21 by subtracting the test-level effects from the respective at-level means.

Table 1-22 presents the test-level effects for different groups of students whose parents differ in educational attainment. In terms of the classification of the mother's educational level, it may be observed that test-level effects differ among the three analyses groups in some cases, particularly for grade 2/fall, grade 3/spring, and grade 5/spring. In reading, the below-level tests clearly reduce the average scores for the group of students whose mothers have college degrees. These phenomena suggest substantial ceiling effects for the below-level tests for the groups. In math, the below-level tests are found to reduce the average scores for all three analyses groups at grade 3/spring and grade 5/spring. But the reductions in means are considerably larger for the group with college-educated mothers than for the other two groups. A considerable decrease in the mean with the below-level test is also observed for the group with college-educated mothers at grade 6/spring. However, an examination of the data in Tables 1-19 and 1-22 jointly reveals that the differences in achievement scores among the three groups in these cases are still large in terms of their below-level scores because of the substantial differences detected with the at-level tests. The results for the analyses using the father's educational attainment to categorize the students are parallel to those obtained with the mother's education as the grouping factor.

The test-level effects for groups of students with different CE selection statuses are examined in Table 1-23. In conjunction with Table 1-20, it may again be observed that differential test-level effects exist in some cases, but significant group differences remain whether the comparisons are based on the at-level or below-level tests.

Additionally, the test-level effects in relation to achievement status are examined in Table 1-24. To avoid the regression effects of repetitive test scores due to unreliability, the classification of achievement status was based on at- and below-level scores jointly. Explicitly, the bottom-quarter group includes the students whose at- and below-level percentile scores were both in the first quarter. The top-quarter group includes those whose two percentile scores were both in the fourth quarter. The rest of the students are included in the inter-quarter group. The data show no substantial bias against the bottom-quarter group when at-level tests were employed. In contrast, biases against the top-quarter group are evident in some cases if below-level test scores are the bases for comparison. These phenomena are particularly noticeable when the ceiling effects of the below-level tests are severe, such as in the spring of grades 3 and 5.

Table 1-23

Test-Level Effects (At-Level VSS Minus Below-Level VSS) and Student CE Selection Status

Grade		Reading			Math		
		Title I Selectees	Other-CE Selectees	Non-Selectees	Title I Selectees	Other-CE Selectees	Non-Selectees
Grade 1	N	57	66	377	24	48	428
Fall	Mean	9.84	−5.20	.60	13.79	.40	−.48
	S.D.	30.51	39.04	37.96	27.73	32.65	30.15
Spring	Mean	−7.10	−7.26	−1.54	3.54	−.42	.60
	S.D.	33.48	31.24	30.35	38.24	34.36	28.29
Grade 2	N	72	66	362	36	43	421
Fall	Mean	−.76	−2.76	4.05	−5.08	.42	−1.59
	S.D.	33.57	28.07	30.29	30.19	27.45	29.80
Spring	Mean	4.01	.18	1.39	−3.03	−6.86	−3.39
	S.D.	41.17	29.78	33.23	35.45	34.00	27.60
Grade 3	N	89	56	355	39	39	422
Fall	Mean	.53	−3.77	−4.11	−20.56	−10.41	−8.43
	S.D.	31.05	33.06	32.90	38.43	33.44	30.22
Spring	Mean	2.94	−5.30	15.28	2.56	14.21	23.61
	S.D.	29.87	31.51	41.64	23.47	46.11	38.04
Grade 4	N	78	46	376	40	46	414
Fall	Mean	.81	4.83	−3.66	5.63	3.15	−7.52
	S.D.	34.32	30.32	30.78	36.18	31.48	37.15
Spring	Mean	−14.69	3.43	−5.67	−12.63	5.07	−3.36
	S.D.	28.70	33.40	28.25	31.88	40.79	41.55
Grade 5	N	56	54	390	28	47	425
Fall	Mean	−5.86	2.39	.07	−.89	−6.19	.82
	S.D.	37.24	26.13	30.57	28.65	36.06	38.37
Spring	Mean	−1.84	−1.56	.43	7.25	20.83	23.12
	S.D.	33.16	37.53	36.00	31.82	47.23	43.69
Grade 6	N	34	37	429	16	32	452
Fall	Mean	15.12	−8.54	−8.43	−10.50	.16	−6.77
	S.D.	36.89	33.69	34.96	39.58	42.85	45.41
Spring	Mean	−.38	4.51	−2.74	−5.38	.22	7.42
	S.D.	38.18	31.44	32.80	50.28	41.34	41.42

In summary, differential test-level effects for different student groups are not expected to drastically alter the group differences in achievement scores, if they exist. However, the ceiling effects of tests should be carefully avoided as they may greatly depress high scores. In the evaluation of CE, one may argue that the achievement scores at the top range are not of concern, and thus one need not be bothered by the ceiling effects of a test on a few high scores. Considering the differential test-level effects, scores based on the 'SDC-recommended' test levels that were determined with an aim to reduce ceiling and floor effects of the tests for each grade at each school are to be employed in all SES analyses that deal with the effectiveness of CE.

Table 1-24

Test-Level Effects (At-Level VSS Minus Below-Level VSS) and Student Achievement Status

Grade		Reading			Math		
		Fall Achievement Status*			Fall Achievement Status*		
		Bottom Quarter	Inter-Quarter	Top Quarter	Bottom Quarter	Inter-Quarter	Top Quarter
Grade 1	N	64	373	63	58	372	70
Fall	Mean	4.81	−1.48	10.92	−5.21	.20	5.31
	S.D.	29.31	38.81	35.09	27.05	32.26	20.60
Spring	Mean	−1.77	−5.36	10.29	6.93	−.87	3.46
	S.D.	35.96	29.41	30.83	37.80	28.36	26.22
Grade 2	N	91	321	88	88	331	81
Fall	Mean	.63	−2.21	21.38	−3.63	−2.14	2.36
	S.D.	32.58	29.14	26.22	28.29	31.01	24.62
Spring	Mean	5.25	−2.17	11.63	.45	−4.42	−5.05
	S.D.	46.42	31.12	25.97	30.50	29.11	25.12
Grade 3	N	96	314	90	100	315	85
Fall	Mean	−5.17	−4.29	2.47	−7.83	−10.02	−9.71
	S.D.	33.99	33.32	27.78	33.07	31.96	26.53
Spring	Mean	−4.88	3.91	51.44	4.38	17.20	56.00
	S.D.	37.65	30.87	41.60	33.13	33.66	39.06
Grade 4	N	71	338	91	76	341	83
Fall	Mean	5.03	−1.78	−9.34	.11	−6.04	−8.37
	S.D.	31.35	32.72	24.30	35.17	38.92	28.08
Spring	Mean	−6.93	−6.54	−4.60	−5.53	−6.67	12.41
	S.D.	31.89	27.37	33.16	45.15	36.92	48.54
Grade 5	N	97	303	100	106	309	85
Fall	Mean	−5.53	.96	.74	−3.38	−2.74	14.55
	S.D.	35.56	28.22	33.80	33.48	39.77	31.23
Spring	Mean	−5.52	−3.77	16.58	11.54	16.61	54.74
	S.D.	34.72	33.52	38.90	39.08	40.01	46.41
Grade 6	N	93	297	110	79	320	101
Fall	Mean	−.33	−7.28	−11.15	−4.77	−8.84	−.19
	S.D.	36.99	36.11	31.58	48.93	47.58	31.16
Spring	Mean	1.39	−3.22	−1.76	−3.97	7.25	12.54
	S.D.	40.52	28.50	37.47	43.52	42.36	36.85

*Fall achievement status was determined on the basis of at- and below-level percentile scores jointly.

Finally, as an illustration of how Tables 1-18 to 1-23 may be utilized to derive other mean scores that are of interest, the average raw gains in the Vertical Scale Scores from fall to spring of the 1976-77 school year are derived for our sampled data from Tables 1-20 and 1-23, and presented in Table 1-25 by CE selection category. As emphasized earlier, these data cannot be employed alone to determine the effectiveness of CE because the three groups differ considerably in their fall achievement scores. In Table 1-25, the average gains on the basis of at-level tests can be directly obtained from Table 1-20 by subtracting the fall averages from the corresponding spring averages. The average gains on the basis of below-level tests were

obtained by adding the respective fall test-level effects (given in Table 1-23) to the at-level average gains, and then subtracting the respective spring test-level effects from these sums. Again, the between-test-level discrepancies in average gains are not large (in terms of VSS units) in most cases. In reading, large differences are found for non-selectees in grade 3, and for selectees in grade 6. The former is likely an indication of the ceiling effects, and the latter is probably a result of the floor effects. In math, pronounced differences between the two levels are observed in grades 3 and 5 for all groups, evidently due to the ceiling effects of the below-level tests. To ensure that test levels employed are appropriate for the students and, thereby, to reduce possible distortions of the analytical results due to ceiling and floor effects of the tests, the SES decided to base all analyses on the scores obtained with the aforementioned 'SDC-recommended' test levels.

Table 1-25

Average Raw Gain in Vertical Scale Scores from Fall to Spring by CE Selection Status (1976-77 School Year)*

Grade	Test Level	Reading			Math		
		Title I Selectees	Other-CE Selectees	Non-Selectees	Title I Selectees	Other-CE Selectees	Non-Selectees
1**	At-level	35.98	59.84	63.28	50.00	48.04	59.60
	Below-level	52.92	61.90	65.42	60.25	48.86	58.52
2**	At-level	45.17	43.85	44.21	46.53	55.35	55.52
	Below-level	40.40	40.91	46.87	44.48	62.63	57.32
3	At-level	35.68	37.25	40.04	69.06	72.52	69.26
	Below-level	33.27	38.78	20.65	45.94	47.90	37.22
4	At-level	18.95	25.74	29.83	47.65	36.22	57.30
	Below-level	34.45	27.14	31.84	65.91	34.30	53.14
5	At-level	29.70	23.46	26.32	42.89	54.09	48.17
	Below-level	25.68	27.41	25.96	34.75	27.07	25.87
6	At-level	20.39	30.46	30.80	48.19	43.72	54.30
	Below-level	35.89	17.41	25.11	43.07	43.66	40.11

*These data are not presented as estimates of program effects; differences between groups have not been adjusted in any way to gauge program effects accurately.

**For grades 1 and 2, the raw gain in Vertical Scale Score units are obtained with different test levels for spring and fall. (See Table 1-2 for test levels involved).

CHAPTER 2. MEASURES OF PRACTICAL ACHIEVEMENT AND AFFECT

Although the Comprehensive Tests of Basic Skills (CTBS) were planned as the major measures of outcome of the educational programs studied in the SES, two additional measures were used in an attempt to measure student growth more broadly. Through the consideration of additional measures, analyses of the effects of the educational programs will not be limited to traditional academic achievement and the findings will then be less subject to the criticisms that are frequently leveled at standardized assessments of achievement.

THE PRACTICAL ACHIEVEMENT SCALE

The Practical Achievement Scale (PAS) was developed for the SES to assess functional literacy and math skills in the fourth through sixth grades. Concern about the use of standardized tests of reading and math achievement as the sole index of achievement, particularly in assessing disadvantaged and minority students, resulted in the selection and administration of a test of more practical skills as well.

The PAS consists of 14 pictures, each followed by one to three multiple-choice questions. Each question can be answered in large part by referring to the picture. Practical achievement was defined as the capability to perform reading and computational tasks that:

- Are normally encountered in the course of everyday life by a majority of children;
- Are normally encountered repeatedly, or for long periods of time;
- Involve commerce with materials commonly found in the environment of the child;
- Involve non-technical language and symbolic representation commonly associated with the materials;
- Require behavior directly obtainable from the stimulus materials;
- Serve obvious social functions; and
- Are regarded as important by the child or by authority figures, or have obvious and non-trivial socioeconomic benefits.

As may be inferred from the characteristics listed above, one of the distinguishing features of the PAS is that it emphasizes stimuli that are present in the instrument itself and minimizes the requirement that the examinee draw upon presumed past learning. It therefore eliminates aspects of subcultural differences that may be thought to be present in standardized achievement tests. The stimuli further were selected to be common to children of most subcultures in America; for example, it was decided on the basis of informal surveys that experience reading menu boards at fast-food-chain outlets was common to most children in the major subcultural groups.

Field tests indicated that the items of the PAS were too difficult for students below grade 4, but an attempt to produce a simpler test resulted in items that no longer resembled real-world

situations. Therefore, the PAS was administered only to students in the fourth, fifth, and sixth grades.

Comparisons among the CE receipt categories and other subgroups with respect to performance on the PAS are reported elsewhere (Wang et al., 1978), so only population-descriptive statistics are provided here. Projected means and standard deviations of the fall Year 1 total score, by grade, are presented in Table 2-1. An unweighted analysis-of-variance of the total score by grade was significant beyond the .001 level, with 15 percent of the variance being accounted for by growth over the grade levels. The fall percentile conversions of raw scores are shown, by grade, in Table 2-2. From the percentiles it can be seen that the PAS is fairly difficult for fourth-grade students and fairly easy for sixth-grade students. Serious floor or ceiling effects are not apparent at either of the grades, however.

Table 2-1

Nationally Projected Means and Standard Deviations of Total Scores on the Practical Achievement Scale, by Grade

Grade	Mean	Standard Deviation
4	14.08	6.59
5	18.41	6.78
6	20.78	6.32

For each of the three grades, a subsample of students was chosen randomly. For each subsample the alpha reliability coefficient for the total score for fall of Year 1, and the intercorrelations among fall of year 1, spring of Year 1, and fall of Year 2 total scores were calculated. These coefficients are presented in Table 2-3. As can be seen, the alpha coefficients are in the high 80's, indicating high internal consistency among the items. In addition, the intercorrelations among test administrations are all in the 70's, indicating a high stability of the scores. The results of these analyses bode well for the effective use of the PAS as an outcome measure in later analyses.

STUDENT AFFECTIVE MEASURES

The measurement of student affect was seen as an important part of the assessment of student growth required by the SES. More specifically, we wished to measure attitudes toward school, and attitudes toward reading and math, together with self concepts in the school setting. An available instrument, *Survey of School Attitudes* (Harcourt Brace Jovanovich), assesses attitudes toward reading (20 items) and toward math (20 items). To these 40 items, three additional groups of items were added: attitude toward school in general (4 items), self-concept in the school setting (4 items), and sense-of-change in the students' own attitudes toward math, reading, school in general, and self-concept at school (8 items). Preliminary factor analyses indicated that the 16 added items did not clearly separate into three scales, so they have been treated as one subscale, which was named 'attitude toward school'. Thus

Table 2-2

Percentile Conversions (Nationally Projected) of Raw Scores by Grade for the Total Score From the Practical Achievement Scale

Raw Score	Percentile Conversions		
	Fall, Grade 4	Fall, Grade 5	Fall, Grade 6
0	1	1	1
1	2	1	1
2	2	1	1
3	4	2	1
4	6	2	1
5	9	3	2
6	13	5	2
7	18	7	3
8	24	10	4
9	30	13	6
10	36	16	8
11	42	20	10
12	47	24	12
13	52	28	15
14	57	32	18
15	62	37	21
16	66	41	25
17	70	45	29
18	74	50	33
19	78	55	37
20	82	59	42
21	85	64	47
22	88	69	53
23	91	74	59
24	93	79	65
25	96	84	73
26	98	89	80
27	99	94	87
28	99	97	94
29	99	99	98
30	99	99	99

Table 2-3

Internal-Consistency and Test-Retest Reliability Coefficients by Grade for the Total Score on the Practical Achievement Scale

Grade	Alpha Coefficient		Fall Year 1 With Spring Year 1		Fall year 1 With Fall Year 2		Spring Year 1 With Fall Year 2	
	α	N	r	N	r	N*	r	N
4	.87	478	.75	639	.72	245	.72	252
5	.87	542	.79	648	.74	203	.75	210
6	.88	666	.72	801	N/A	N/A	N/A	N/A

*Sample size reduction in Year 2 is explained in the footnote for Table 2-7.

the final instrument, named Student Affective Measures (SAM), consisted of 56 items divided into three subscales. Two levels of the instrument were developed: primary for grades 1 to 3, and intermediate for grades 4 to 6.

As a rule the SAM is administered in both the fall and spring of each school year, with the exception that grade 1 students do not receive the fall administration because they do not have enough school experience about which to form attitudes; thus any responses that they might give would have little or no bearing on the school or its programs.

The means and standard deviations, by grade, are shown in Table 2-4, for each subscale and the total score. These statistics are projected to the national population, and all are based on fall, Year 1 data except the grade 1 scores which are based on spring, Year 1 data. Note that the means tend to decrease as grade increases, a result either of slowly deteriorating attitudes or of slowly decreasing positive response bias.

Table 2-4

Nationally Projected Means and Standard Deviations of Total and Subscale Scores from the Student Affective Measures, by Grade

Scale		Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
Total Score	Mean	83.98	80.78	80.72	77.66	76.39	74.64
	S.D.	19.54	20.01	19.65	18.57	18.71	18.55
Attitude Toward Reading	Mean	29.89	28.75	29.07	29.45	28.67	27.53
	S.D.	7.03	7.31	7.06	6.47	6.62	6.75
Attitude Toward Math	Mean	29.13	27.57	27.43	24.75	24.85	24.58
	S.D.	8.61	8.93	9.08	9.02	9.22	9.22
Attitude Toward School	Mean	24.96	24.46	24.22	23.46	22.87	22.52
	S.D.	6.44	6.46	6.29	6.20	6.28	6.18

*Scores for Grade 1 come from the spring administration; all other scores come from the fall administration.

For each grade a subsample of students was randomly selected, and the alpha coefficient of reliability was computed for each of the three subscales and the total score. These coefficients are presented in Table 2-5. Again, data from grade 1 are from the spring administration while data for grades 2 to 6 are from the fall administration. Alpha coefficients for the subscales are generally in the 80's, while for the total score, alpha is .93 to .94, indicating a high internal consistency for the instrument.

Using a random subsample again, the intercorrelations among subscales were calculated, using fall data from Year 1 for grades 2 to 6, and spring data for grade 1. The intercorrelations are presented in Table 2-6. The subscale-to-total score correlations range from .78 to .92, while the correlations among the three subscales range from .49 to .73. These correlations among the subscales indicate that our measures of attitudes are strongly correlated with one another and that we cannot clearly distinguish among them. Because of the high inter-

Table 2-5

Internal-Consistency Reliability Coefficien[illegible]by Grade for Total and Subscale Scores from the Student Af[illegible]tive Measures

Scale	Grade 1 (N = 664)	Grade 2 (N = 607)	Grade 3 (N = 593)	[illegible]ade 4 (N [illegible] 539)	Grade 5 (N = 589)	Grade 6 (N = 709)
Total Score	.93	.94	.94	.94	.94	.93
Attitude Toward Reading	.80	.85	.84	.84	.83	.82
Attitude Toward Math	.87	.89	.90	.91	.90	.90
Attitude Toward School	.85	.87	.87	.86	.86	.85

relatedness among the measures relative to their reliabilities, it will be preferable in later analyses to employ only the total score.

Finally, test-retest reliabilities were calculated by intercorrelating the scores for fall, Year 1, spring, Year 1, and fall, Year 2, using a random subsample of students. As can be seen from Table 2-7, the intercorrelations range from .30 to .68, indicating that the stability of this instrument is not very high. These low estimates of score stability will have serious consequences for later analyses where the SAM is employed. SAM score stabilities also seem to be higher at the higher grades. It is interesting to note that the inter-level articu[illegible] of the

Table 2-6

Intercorrelations Among Total and Subscale Scores from the Student Affective Measure by Grade

Grade	Attitude Scale	Correlation Matrices*			
		Total	Reading	Math	School
Grade 1** / Grade 2	Total	—	.87	.91	.87
	Reading	.89	—	.67	.65
	Math	.91	.71	—	.68
	School	.84	.64	.64	—
Grade 3 / Grade 4	Total	—	.89	.92	.85
	Reading	.85	—	.73	.67
	Math	.91	.64	—	.66
	School	.83	.60	.62	—
Grade 5 / Grade 6	Total	—	.82	.90	.83
	Reading	.81	—	.61	.54
	Math	.86	.52	—	.63
	School	.78	.52	.49	—

* In each matrix the entries above the diagonal are from the lower grade; those below the diagonal are from the higher grade.

** For Ns, see table 2-5.

instrument causes some difficulties over and above general test-retest reliability. This is apparent in the slightly lower correlations for grade 3, which grade was administered to the primary level in Year 1 and the intermediate level in Year 2. In addition, inspection of the cross-sectional means in Table 2-4 indicates problems for between-level scaling in later analyses of affect.

Table 2-7

Test-Retest Reliability Coefficients for Total and Subscale Scores of the Student Affective Measures, by Grade

Grade At First Testing	Time and Year of Test Administration	Sample Size*	Total Score	Attitude Toward Reading	Attitude Toward Math	Attitude Toward School
1	Fall, Yr. 1 – Spring, Yr. 1	294	.55	.46	.59	.36
	Fall, Yr. 1 – Spring, Yr. 1	581	.47	.43	.45	.41
2	Fall, Yr. 1 – Fall, Yr. 2	245	.37	.30	.30	.41
	Spring, Yr. 1 – Fall, Yr. 2	263	.56	.50	.53	.47
	Fall, Yr. 1 – Spring, Yr. 1	664	.49	.46	.44	.44
3	Fall, Yr. 1 – Fall, Yr. 2**	261	.41	.32	.41	.38
	Spring, Yr. 1 – Fall, Yr. 2**	274	.50	.38	.49	.46
	Fall, Yr. 1 – Spring, Yr. 1	642	.50	.48	.44	.46
4	Fall, Yr. 1 – Fall, Yr. 2	223	.47	.44	.41	.49
	Spring, Yr. 1 – Fall, Yr. 2	234	.60	.61	.58	.56
	Fall, Yr. 1 – Spring, Yr. 1	633	.58	.57	.56	.48
5	Fall, Yr. 1 – Fall, Yr. 2	186	.62	.59	.60	.55
	Spring, Yr. 1 – Fall, Yr. 2	203	.67	.62	.68	.60
6	Fall, Y. 1 – Spring, Yr. 1	[illegible]	.61	.58	.59	.54

*Because first-grade students are not administered the SAM at the fall of their first year, and because sixth-grade students will have left the study in the second year, the SAM was administered to them only twice. The large reductions in sample sizes between administrations in Year 1 and Year 2 are caused by the selective elimination of schools to reduce the size of the Year 2 sample. Because these reliability samples were selected from the Year 1 sample, the reductions reflect deliberate elimination of schools much more than uncontrollable attrition of students.

**The coefficients in these two rows were computed based on different levels (forms) of the SAM; Primary for Year 1 and Intermediate for Year 2.

CHAPTER 3. MEASURES OF EDUCATIONAL SERVICES AND PROGRAMS

In Chapters 1 and 2, three instruments were presented that directly assess educational outcomes of growth in achievement and development of positive attitudes toward education. If the measures of outcome are thought of as dependent variables, there are several sets of independent variables also to be considered. The remaining chapters of this report present the measures of those sets of independent variables. Although it is still a matter of conjecture which set, or even which variables or measures are the critically explanatory or causative independent variables, the educational services received by each student at each school constitute the linchpin upon which most CE programs are conceived and operated. Therefore, their measures are discussed first.

COMPENSATORY EDUCATION ROSTER

The Compensatory Education Roster (CER) is completed by the coordinator at each school in March for the entire school year. For each student in grades 1 through 6, the coordinator indicates the CE program(s) for which the student has been selected. The programs are indicated separately for reading and for math, and include Title I, Other Federal, State, District, and Private.

At first glance, the CER appears to be an eminently simple instrument, but the opposite is the case when one has to respond to it. The instructions state: " . . . fill in the circle . . . to indicate compensatory services being received in reading and mathematics. Only fill in the circle when students have been designated to receive compensatory services because they are low achieving . . . " The complications arise from the use of the words 'receive', 'designated', and 'low achieving'. These words have very precisely defined meanings according to the regulations accompanying some CE programs, such as Title I. The precise meanings are not shared by all CE programs or by all school personnel, however. For example, words like 'selected to receive', 'designated for receipt', and 'receives' lie somewhere along the semantic continuum between a school's deciding who should get compensatory services and a student's exposure to the services. Both by law and by common interpretation a student to whom one of the words applies may not be a student to whom another applies: A selected student *may not* receive, and a recipient *may* receive for *reasons independent of selection or designation*. "Many a slip 'twixt cup and lip" is a singularly appropriate description of the situation. The situation is complicated further when the consideration of low achievement is added. Low achievement was not defined, as a definition seemed to be a needless verbal complication.

Because there appeared to be no easy solution to these difficulties that would not entail the revision of the CER into a more complicated instrument, burgeoning with hair-splitting definitions, the instrument was kept in its simple format and school coordinators were encouraged to call SDC to obtain verbal clarification. It is not known, however, to what extent the coordinators were aware of any confusion that called for clarification. Several examples of

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the more difficult questions from school coordinators are provided below, with their answers, to give the reader an idea of their nature and complexity.

- Q: What if we don't get CE funds and we don't have a formal CE program, but some students are given special services just like CE services?

  A: Do not count students as recipients of CE services, since there is no accurate way the services can be associated with any funding source. (Later, students who were counted in error were reclassified as not receiving CE services, on the basis of responses to other instruments.)

- Q: How about students who receive CE services during only part of the school year?

  A: Count those students as recipients of CE services.

- Q: Our reading specialist is funded by the district to give extra help to low-achieving students. Do I indicate all students she/he teaches?

  A: No, only those students to whom she/he is providing CE services. (Later, if the district did not consider the funds to be compensatory, these were changed so that the students were considered not to receive compensatory services from the district.)

- Q: How about students who get extra help because they have a learning disability?

  A: If the funds supporting that extra help are considered compensatory, then mark those students as receiving the appropriate compensatory services.

- Q: I. we' , book: for the library, all students can use them; then how do I complete the CER?

  A: If the funds are clearly CE funds, and library books are the only things purchased from those funds, then mark all students as receiving that CE service. If the funds are not clearly CE funds, then mark none of the students as receiving that service. If the funds are CE funds, but the library purchases are only a small part of the expenditures of those funds, then classify students on the basis of the other services, mostly those directly provided to the students.

- Q: What is your definition of compensatory services?

  A: Compensatory services are those services or service materials purchased from funds clearly labelled as compensatory. In most cases, but not all, such services will be directed to a target group of students, generally those whose achievement is low.

- Q: What is meant by a 'designated student'?

  A: If, for any compensatory service, there is a list of students who are to receive the services (not just 'eligible' to receive them), we only want to know who is on the list, regardless of whether or not you know they have actually been receiving some kind of different or additional services. If there is no list, we want you to

indicate which students received the services at some time during the school year.

From the telephone conversations with school coordinators it became apparent that most of them interpreted our instructions in the following manner: '. . . fill in the circle . . . to indicate compensatory services being received in reading and mathematics.' We concluded that the use of this interpretation only minimally confounded the desired meaning of the responses given.

The CER provides data to be used in answering many of the fundamental questions addressed in the SES. Its primary use is to group students into various CE categories for purposes of comparison. A second use was made possible by combining information from the CER with information from the District Expenditure Questionnaire, yielding estimates of per-pupil expenditures for compensatory services.

The first section below presents the percentages of students in various CE categories, based on information from the CER, while the second section presents the estimates of per-pupil expenditures.

Compensatory Education Categories. Table 3-1 presents the number and percentage of students in each of the CER categories, projected to the population. In addition, we have projected the percentages of students who were selected to receive any of the types of reading CE, any math CE, and any CE (reading and/or math). It can be seen that about one-fourth of the students in elementary grades are selected to receive CE services. More students receive reading CE services than math CE services, but many receive both. More students are selected for Title I services than for any other CE services.

For many of the analyses, it was desirable to have categories of students different from those provided by the CER, because some of the CER categories contain very small numbers of students, and because the primary focus of the Sustaining Effects Study is on Title I. Thus, we decided not to differentiate among the non-Title I categories. As a result, students were grouped into three categories: (1) those selected for Title I (with or without other non-Title I selection), (2) those selected for only non-Title I, and (3) those not selected for CE services. In addition, the schools were differentiated in terms of the types of CE funds they received. This was necessary to examine the possibility that the presence of Title I programs, for example, influences the character of non-Title I CE programs in the same school, so that those non-Title I programs are more similar to Title I programs than they are to non-Title I programs in schools that do not receive Title I funds. It may also be that students in Title I schools who are not selected for CE are different in important ways from students in non-Title I schools who are not selected. To capture these possible differences, schools were grouped into three categories: (1) schools that receive Title I funds (with or without other non-Title I funds), (2) schools that receive only non-Title I compensatory funds, and (3) schools that receive no compensatory funds. By combining the student grouping with the school grouping, students could be classified into six meaningful categories.

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Table 3-1

Percentages of Students in Grades 1-6 Selected to Participate in Various Compensatory Education Programs (Projected to the National Population)

CE Participation Total Number of Students Projected	Grade 1 3,409,700	Grade 2 3,193,064	Grade 3 3,204,303	Grade 4 3,276,458	Grade 5 3,417,955	Grade 6 3,426,963
CE Reading Programs:						
Title I	12.5	16.0	15.5	14.3	12.1	9.4
Other Federal	3.5	3.2	3.0	1.8	2.1	3.0
State	7.0	7.3	6.5	5.1	4.8	4.7
District	5.8	7.3	6.0	6.3	5.3	4.3
Private	0.0	0.0	0.0	0.1	0.0	0.0
CE Math Programs:						
Title I	6.2	8.0	8.2	8.0	7.7	6.2
Other Federal	2.6	2.6	3.0	2.0	2.2	2.9
State	5.6	5.5	5.0	5.3	4.9	3.7
District	3.9	3.7	4.3	4.8	3.8	3.5
Private	0.0	0.0	0.0	0.1	0.0	0.0
Any Reading CE	22.1	27.3	25.3	23.7	21.3	18.6
Any Math CE	15.3	16.8	16.6	17.3	16.0	14.0
Any CE (Reading &/or Math)	23.4	29.9	27.5	27.2	24.6	20.6

The categorization was done separately for reading and math. Table 3-2 presents these categories along with the projected percentages of students in each.

Compensatory Education Expenditures. Two approaches to the analysis of expenditures were taken in the SES. In one of these, the amount of a resource (staff member, equipment, etc.) dedicated to a student was estimated by multiplying a unit cost for that resource (e.g., an hour of a remedial reading specialist's time) by the number of units received by the student. This approach was reported in Technical Report #6 (Haggart, Klibanoff, Sumner, and Williams, 1978), and will not be discussed further here.

In the second approach, expenditure data were obtained for each school by means of the District Expenditure Questionnaire, (see Chapter 9). These data indicated the total expenditures for the school. From the number of students participating (from the CER), and the total enrollment in grades 1-6, total expenditures could be converted to per-pupil expenditures on the assumption that all participating students shared equally. The expenditure data were collected for three funding sources (Title I, District/State, Other Federal) and three activities (Reading, Math, and Community Activities). At the student level, each student's share of the expenditure was matched to the student's CE selection indicator for the funding source and activity category. Thus, for each student there is an expenditure figure for each funding source and activity. Total CE funding for each student was then obtained for reading, math, and community activities by summing the student's expenditures over all three funding sources. Table 3-3 presents the mean per-pupil funds, by funding source and activity, for students in

Table 3-2

Percentages of Students in Grades 1-6 Grouped According to CE Selection Status and School CE Funding Status (Projected to the National Population)

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
Reading Programs:						
Title I Services in Title I School	12.5	16.0	15.5	14.3	12.1	9.3
Other CE Services in Title I School	6.3	7.0	5.9	6.2	5.5	5.8
Other CE Services in Other CE School	3.4	4.3	3.9	3.2	3.7	3.5
No CE Services in Title I School	52.8	47.6	43.7	47.9	48.1	43.4
No CE Services in Other CE School	17.3	16.6	17.7	17.6	19.0	21.7
No CE Services in Non-CE School	7.9	8.4	13.3	10.8	11.6	16.3
Math Programs:						
Title I Services In Title I School	6.2	8.0	8.2	8.0	7.7	6.2
Other CE Services in Title I School	7.1	6.8	5.4	6.5	5.4	4.9
Other CE Services in Other CE School	2.0	1.9	2.9	2.8	2.9	3.0
No CE Services in Title I School	58.2	55.8	51.4	53.9	52.6	47.5
No CE Services in Other CE School	18.7	19.0	18.7	18.1	19.9	22.2
No CE Services in Non-CE School	7.9	8.4	13.3	10.8	11.6	16.3

schools having expenditures greater than $0. This means, of course, that figures cannot be added down columns or across rows to obtain accurate total expenditures. It is important to keep the calculating method in mind so as to avoid misinterpretation of the tabled figures. The correct interpretation for the $23.00 figure for per-pupil Title I community activities is: The average per-pupil Title I expenditure for community activities, in schools that use Title I funds for those activities, is $23.00. (As a comparative aside, the average per-pupil Title I expenditure for community activities, based on all Title I students, would be lower because some schools do not support their community activities with Title I funds, and the $0.00 expenditures would artificially reduce the per-pupil mean.)

Table 3-3

Means and Standard Deviations of Per-Pupil Compensatory Education Expenditures by Funding Source. Figures Based on the SES Sample of Students with Non-Zero Expenditures

Activity		Funding Source			
		Title I	District/State	Other Federal	Total
Compensatory Reading	Mean	$ 339.78	$ 202.64	$ 191.05	$ 301.14
	S.D.	$ 217.01	$ 217.32	$ 169.33	$ 232.07
	N	9,802	5,587	1,074	15,348
Compensatory Math	Mean	$ 233.47	$ 143.21	$ 153.29	$ 214.46
	S.D.	$ 182.55	$ 170.44	$ 108.40	$ 187.25
	N	4,845	2,634	904	7,624
Community Activities	Mean	$ 23.00	$ 11.59	$ 76.11	$ 24.94
	S.D.	$ 36.91	$ 7.24	$ 8[illegible].11	$ 39.23
	N	4,375	824	[illegible]99	5,362

It should also be noted that this means of estimating expenditure data (dividing total expenditures by the number of students) is merely an estimate, and should not be viewed as precise or accurate. To obtain precise data would have required a very complex questionnaire that would impose an extreme burden on the respondent, and would demand a degree of detailed information that simply does not exist at most district offices. Given the impossibility of such a task, we chose to combine student-level and district/school-level information to give reasonable expenditure estimates without undue respondent burden. As a result, however, these data should be viewed with caution. The standard deviations for these figures are quite large, and indicate a great deal of variability in the data. In many instances, this variability is probably due to inaccurate data. For example, many of the items range from a minimum of $1.00 per pupil to almost $1,000 per pupil. Clearly, the extreme per pupil values are not reasonable in any but a bookkeeping way.

STUDENT PARTICIPATION AND ATTENDANCE RECORD

The Student Participation and Attendance Record (SPAR) was designed to obtain information on the reading and math activities in which individual students participated. For each student, the form was completed four times during the school year by the appropriate reading and math teachers. The major purposes of the instrument are to ascertain the number of hours of instruction received, the types of staff who did the instructing, and the sizes of groups in which the instruction took place.

Each of the four administrations of the questionnaire provided detailed information on each student's instructional activities for one week's time, plus information on how frequently the student was absent during the preceding two months. This enabled us to estimate not only the per-week exposure to instruction, but also the per-year total exposure to instruction.

Table 3-4 presents the means and standard deviations of hours of instruction projected to the national population for each of the six grades. The first seven rows of the table give the summary information on hours of exposure, while the next 20 rows provide the means (in hours per year) for various combinations of staffing and group size (hereafter referred to as the 'profile items'). In addition, Table 3-5 provides data for each of the four administrations (profile items only) of the SPARM. These data are the percentages of total reading (or math) time that students spend in each of the ten reading (or math) activities. As can be seen, the data are fairly consistent across administrations. There is a tendency in both reading and math for large group instruction to increase as grade increases. Note also that there is more emphasis in reading than in math on small group instruction by the classroom teacher.

In order to explore further the relationships among the four administrations of the SPARM, intercorrelations were calculated among the administrations — separately for each of the 20 SPARM items and separately for each grade level — using a sample of at least 500 students per grade. Since there were no differences in the correlation patterns across grades, the correlations were averaged across grades. Table 3-6 presents these average correlations for each of the SPARM items. As can be seen, the correlations are typically in the .50 to .70 range. Two patterns are apparent in this table: (1) administrations that are closer together correlate more highly (e.g., the first administration correlates higher with the second than with the third or fourth), and (2) the later administrations are more strongly correlated than earlier administrations (i.e., the correlations of the second administration with the third, second with fourth, and third with fourth are the highest of the six correlations in almost all instances). This may indicate that a teacher's instructional services stabilize once the student's status and needs become known, but data editing procedures could also have caused the small increases in coefficients.

One other set of correlations was calculated. In this set, the 20 profile items were intercorrelated, separately for each administration, and separately for each grade. This resulted in a set of 4,560 correlation coefficients. After inspecting the patterns across administrations and across grades, and determining that there were no major variations in the patterns, the 4,560 coefficients were reduced by averaging across grades and across administrations, resulting in a final set of 190 correlations, which are presented in Table 3-7. For the most part these coefficients are very small (in the $-.10$ to $+.10$ range). However, certain patterns do emerge: (1) the first four items for both reading and math are moderately and negatively correlated, which reflects the fact that a classroom teacher's time is limited, and if he/she spends a lot of time in large group instruction, there will not be much time for small group instruction (and vice versa), and (2) the correlation of similar items for reading with math are moderate and positive, indicating that similar practices are used in teaching the two subjects.

STUDENT-TEACHER LINKAGE ROSTER

The Student-Teacher Linkage Roster (STLR) is not actually an instrument to be administered to any students. It is merely a record that indicates which students are taught by which teachers. Thus, the major purpose of the STLR is as a linking device in performing analyses that use data from both students and teachers. However, the number of reading and math

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Table 3-5

Percentages of Total Reading and Total Math Time Students Spend in Each Type of Reading or Math Activity, Separately for Each of the Four Administrations of the Student Participation and Attendance Record (Computed from Hours Projected to the National Population)

Activity	Grade 1				Grade 2				Grade 3				Grade 4				Grade 5				Grade 6			
Administration:	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Reading Profile Items:																								
Classroom Teacher,																								
21 + Students	15	15	14	14	11	12	12	12	19	19	19	19	19	19	20	19	23	24	24	24	25	24	24	24
14-20 Students	5	4	4	3	6	6	5	4	7	7	6	6	10	10	9	10	10	9	9	8	11	11	10	10
7-13 Students	27	27	27	25	25	24	25	26	19	20	20	19	20	21	20	19	16	17	16	16	13	13	13	15
1-6 Students	13	13	13	14	14	13	15	14	12	11	10	10	11	10	9	10	11	10	9	9	10	10	10	9
Special Teacher,																								
7 or more	1	1	1	1	2	1	1	2	2	2	2	2	2	1	2	2	2	2	2	2	3	3	3	2
1-6 Students	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2
Aide or Asst, 1-10 Students	4	4	4	4	3	3	3	3	4	4	4	4	2	3	2	2	2	2	2	2	1	2	2	1
Tutor or Volunt., Individuals	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1
Ind. Work, Programmed Materials	3	3	3	3	6	5	5	5	4	3	4	4	5	5	5	5	5	5	5	6	6	6	6	7
Ind. Work, Non-Programmed Materials	29	30	30	31	30	31	30	32	30	31	32	32	27	28	28	28	29	29	30	30	28	30	29	30
Math Profile Items:																								
Classroom Teacher,																								
21 + Students	36	32	36	36	33	36	34	34	41	39	40	39	42	39	40	39	38	39	38	40	42	39	39	41
14-20 Students	11	10	9	8	12	9	10	9	8	6	7	7	9	9	9	9	9	7	6	6	10	11	10	10
7-13 Students	9	7	8	7	6	6	6	7	7	8	7	7	6	7	7	7	9	10	10	9	8	9	9	8
1-6 Students	6	6	6	6	7	7	9	8	5	6	6	6	7	8	8	8	8	9	9	9	7	8	8	7
Special Teacher,																								
7 or more	0	1	0	1	1	1	1	1	1	1	1	1	2	1	2	1	2	2	2	2	2	1	1	2
1-6 Students	0	0	1	0	1	1	1	1	1	1	1	1	2	1	2	2	1	1	2	1	1	1	1	1
Aide or Asst, 1-10 Students	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	1	1	2	2	1	1	1	1
Tutor or Volunteer, Individual	1	1	1	1	1	0	1	1	0	0	1	0	1	0	0	0	1	1	1	0	1	1	1	1
Ind. Work, Programmed Materials	1	1	1	1	3	3	2	2	2	2	2	2	3	3	3	2	3	4	2	4	3	2	3	3
Ind. Work, Non-Programmed Materials	33	36	35	37	34	34	34	35	32	33	33	33	28	28	29	28	27	27	28	27	26	27	27	27

Table 3-6

Intercorrelations of the Four Administrations for each of the Profile Items of the Student Participation and Attendance Record

Profile Item	Correlation of Administrations: First with Second	First with Third	First with Fourth	Second with Third	Second with Fourth	Third with Fourth
Reading Profile Items:						
Classroom Teacher						
21+ Students	.65	.64	.61	.77	.73	.88
14-20	.59	.55	.51	.68	.63	.71
7-13	.57	.53	.54	.69	.66	.76
1-6	.56	.55	.50	.69	.63	.69
Special Teacher						
7 or more	.59	.59	.56	.66	.64	.72
1-6	.53	.47	.46	.64	.62	.63
Aide or Assistant, 1-10 Students	.68	.65	.55	.74	.64	.77
Tutor or Volunteer, Individual	.56	.48	.49	.58	.58	.68
Independent Work, Program Material	.70	.70	.68	.80	.76	.80
Independent Work, Non-Programmed Material	.65	.63	.60	.77	.71	.76
Math Profile Items:						
Classroom Teacher						
21+ Students	.70	.70	.68	.80	.78	.83
14-20	.54	.48	.47	.69	.66	.68
7-13	.56	.55	.53	.70	.58	.69
1-6	.60	.48	.48	.62	.60	.65
Special Teacher						
7 or more	.55	.48	.52	.60	.65	.74
1-6	.44	.30	.34	.51	.48	.61
Aide or Assistant, 1 1-10 Student	.52	.55	.53	.72	.69	.70
Tutor or Volunteer, Individual	.49	.34	.34	.43	.45	.53
Independent Work, Programmed Materials	.62	.62	.59	.64	.68	.69
Independent Work, Non-Programmed Materials	.65	.63	.59	.76	.70	.78

Table 3-7

Intercorrelations Among the 20 Profile Items of the Student Participation and Attendance Record Averaged Across Four Administrations and Six Grades

PROFILE ITEMS	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
Reading																			
01. Classroom teacher, 21+ students																			
02. Classroom teacher, 14-20 students	−.15																		
03. Classroom teacher, 7-13 students	−.20	−.21																	
04. Classroom teacher, 1-6 students	−.16	−.12	−.30																
05. Special teacher, 7 or more studs.	.00	−.04	−.01	−.05															
06. Special teacher, 1-6 students	−.07	−.04	−.05	−.03	−.02														
07. Aide or assistant, 1-10 students	−.05	−.05	−.03	.04	.01	.01													
08. Tutor or volunteer, individual	−.05	−.03	−.03	.06	.01	.00	.02												
09. Individual, programmed material	−.08	−.05	−.10	.03	−.01	−.02	.02	.07											
10. Individual, non-programmed mat.	−.17	−.08	.05	.02	−.10	−.08	−.08	−.04	−.14										
Math																			
11. Classroom teacher, 21+ students	.44	.00	.03	−.15	.04	−.02	−.09	−.07	−.07	−.17									
12. Classroom teacher, 14-20 students	−.13	.27	.02	.00	−.03	−.02	−.02	−.03	−.04	−.03	−.32								
13. Classroom teacher, 7-13 students	−.12	−.04	.27	.01	.06	−.01	.04	.02	.00	−.02	−.30	−.10							
14. Classroom teacher, 1-6 students	−.10	−.05	−.07	.38	−.02	.04	.07	.06	.05	.01	−.26	−.09	−.08						
15. Special teacher, 7 or more studs.	−.03	−.01	−.02	−.01	.21	.01	.01	−.01	−.02	−.05	−.04	−.03	.00	−.03					
16. Special teacher, 1-6 students	−.03	−.01	−.01	.02	.02	.25	.03	.00	−.01	−.04	−.06	.00	−.02	.00	.00				
17. Aide or assistant, 1-10 students	−.06	−.05	−.04	.05	.00	.03	.46	.05	.05	−.07	−.15	−.03	.03	.09	.00	.03			
18. Tutor or volunteer, individual	−.04	−.03	−.01	.06	.01	−.01	.06	.37	.07	−.02	−.10	−.04	.03	.09	.00	.00	.07		
19. Individual, programmed material	−.06	−.01	−.03	.02	−.01	.00	.08	.03	.30	−.07	−.10	−.03	−.02	.06	−.01	−.01	.10	.07	
20. Individual, non-programmed mat.	−.14	−.07	.00	.04	−.05	−.02	−.04	−.01	.02	.53	−.27	−.05	.03	.03	−.07	−.04	−.05	.00	−.10

teachers that teach each student is of interest in its own right, and can be obtained from the STLR.

Table 3-8 presents the mean number of reading and math teachers the students are exposed to, and the percentages of students who have one teacher, two teachers, or three teachers. These figures are all projected to the national population. Note that students are more likely to have several reading teachers than several math teachers, but the vast majority of students receive all their reading instruction from one teacher, and all their math instruction from one teacher and, in fact, the reading teacher and the math teacher constitute the same person. At the higher grades teaching specialization appears more common.

Table 3-8

Percentages of Students Taught by One, Two, Three, and Combinations of Reading and Math Teachers, and Mean Number of Reading and Math Teachers Per Student by Grade (Projected to the National Population)

Number of Teachers	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
Reading Teachers*						
1 teacher	86.2%	81.4%	81.4%	84.0%	84.9%	85.4%
2 teachers	12.0%	15.9%	15.8%	13.6%	12.6%	13.0%
3 teachers	1.8%	2.6%	2.7%	2.4%	2.5%	1.7%
Mean	1.16	1.21	1.21	1.18	1.18	1.17
Standard deviation	0.42	0.47	0.47	0.44	0.44	0.41
Math Teachers*						
1 teacher	94.7%	93.8%	89.6%	89.5%	89.1%	89.3%
2 teachers	4.1%	4.9%	8.9%	7.5%	9.6%	9.3%
3 teachers	1.2%	1.3%	1.5%	3.0%	1.3%	1.4%
Mean	1.07	1.08	1.12	1.14	1.12	1.12
Standard deviation	0.29	0.31	0.37	0.42	0.36	0.37
One teacher who teaches both reading and math	71.5%	63.5%	58.1%	54.7%	47.4%	35.1%
One teacher for reading, and one other teacher for math	9.4%	14.5%	16.0%	22.1%	29.6%	45.1%
At least one supplementary reading or math teacher	18.8%	21.8%	25.5%	22.8%	22.7%	19.6%
No reading or math teacher linked to student	0.3%	0.2%	0.5%	0.4%	0.3%	0.1%

*Students not linked to any teacher (see bottom row of table), are not included in these tabulations.

CHAPTER 4. MEASURES OF BACKGROUND AND OTHER SCHOOL EXPERIENCES

Chapter 4 presents the last of the instruments that collect information about individual students. These instruments provide further data of the independent-variable type. These data can also be seen as historical/contextual information that is frequently analyzed in conjunction with information of achievement growth in order to provide a background against which the growth may be viewed.

SUMMER ACTIVITY SLIPSHEET

The Summer Activity Slipsheet (SAS) was designed to obtain information about a student's exposure to cognitive experiences over the summer. Of primary concern was attendance in summer school, but other activities that might be intellectually stimulating were looked at as well. The questionnaire has six items to be completed by each student in the fall of each school year. Three of the items deal specifically with summer school, while the other three deal with general activities (one item) and reading activities (2 items). This instrument was not given to students in grade 1 because they were not expected to have had school experience in the previous summer.

The percentages of students who gave each response to each item are shown in Table 4-1. These percentages are projected to the national population. Note that only about 10 percent of the students attended summer school (items 4-6). It should also be noted that item 1 was scored in a special way: the original item asked the student to indicate which of ten activities were engaged in during the summer (multiple responses were permitted). Rather than scoring each of the ten activities, we simply gave each student 1 point if he/she "went to camp" or "was in a scout group or church club", and 2 points if both were marked. If neither of these two were marked, the score was zero. The reason for this scoring procedure is that we are interested only in activities that provide structured opportunities for learning. Of the activities listed, camping and scout groups/church clubs are the only non-summer school activities assumed generally to provide such opportunities.

In addition to the answers to each item, each student earned a score on three composite variables: Summer Reading Experience, Summer Math Experience, and Summer Intellectual Experience. The Summer Reading Experience Score was obtained as follows:

> score for item 1 (0-2 points) + score for item 2 (0-4 points) + score for item 3 (0-5 points) + [score for item 4 × score for item 5 (0-48 points)].

Thus, the Summer Reading Experience score can range from 0 to 59 points, with the greatest contribution being made by summer school attendance in which reading was taught.

The Summer Math Experience score was obtained in a similar way:

> score for item 1 (0-2 points) + [score for item 4 × score for item 6 (0-48 points)].

Table 3-4

Means and Standard Deviations of Hours of Instruction in Reading and Math, by Grade (Projected to the National Population)

	Grade 1		Grade 2		Grade 3		Grade 4		Grade 5		Grade 6	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
No. of Weeks Attended	33.56	2.42	33.63	2.13	33.95	2.20	33.98	2.28	34.03	2.26	33.83	2.38
Hours of Reading Per Week	9.06	2.88	8.54	2.80	6.90	2.31	5.91	1.79	5.62	1.76	5.32	1.80
Hours of Reading Offered Per Year	322.11	101.91	304.08	101.58	246.14	84.26	210.71	65.11	200.94	64.50	189.63	66.01
Hrs. of Reading Attended Per Year	302.61	98.15	288.36	99.47	232.78	80.27	199.70	62.39	190.54	62.09	178.87	62.83
Hours of Math Per Week	5.01	1.97	5.05	1.55	4.90	1.10	4.96	1.19	4.94	1.15	4.84	1.04
Hrs. of Math Offered Per Year	177.49	67.41	179.15	54.07	174.96	40.09	176.74	43.23	176.47	41.49	172.41	36.92
Hrs. of Math Attended Per Year	166.49	63.13	169.57	52.00	165.62	38.60	167.70	42.45	167.40	40.03	162.73	35.66
Reading Profile:												
Classrm Tchr, 21+ Students	44.92	66.63	35.19	60.62	41.38	57.91	38.03	56.52	44.76	61.66	40.14	52.35
14-20	12.02	33.88	14.37	39.10	14.66	40.38	18.71	39.50	15.51	33.87	17.41	34.08
7-13	81.92	81.27	71.13	74.88	46.17	55.47	40.53	52.94	30.49	43.22	26.39	44.94
1-6	38.03	53.83	38.27	59.08	25.85	40.66	19.91	35.01	18.44	33.18	18.59	36.60
Specl Tcher, 7 or more	3.08	17.05	4.41	19.38	4.54	18.32	4.00	18.40	3.78	18.67	5.03	20.97
1-6	5.95	21.70	8.25	27.29	7.20	23.41	6.63	21.52	5.18	19.56	3.48	15.19
Aide or Asst, 1-10 Stud.	12.45	26.13	8.85	22.93	9.44	23.28	5.29	17.25	4.13	15.73	3.24	14.65
Tutor or Volunt., Individ.	3.63	12.06	2.40	9.41	1.96	9.02	0.98	5.39	1.18	5.60	0.87	4.57
Ind. Work, Programmed Mat.	7.85	26.45	15.21	43.52	7.81	22.02	8.98	24.00	11.16	28.47	11.00	25.99
Ind. Work, Non-Prog. Mat.	82.36	58.13	90.09	63.64	73.51	53.92	56.03	47.38	55.69	43.10	52.28	40.52
Math Profile:												
Clssrm Tcher, 21+ Students	59.83	56.35	57.82	50.91	64.88	51.62	64.63	53.58	62.52	55.25	64.44	56.93
14-20	15.03	32.88	15.16	31.87	10.99	25.02	15.06	33.52	11.90	29.28	15.94	32.37
7-13	13.11	28.81	12.28	33.88	12.47	28.47	12.27	30.25	16.65	34.57	15.13	34.79
1-6	9.89	20.30	13.21	24.27	9.71	20.41	13.60	28.57	14.91	29.14	12.29	27.86
Specl Tcher, 7 or more	0.73	6.14	1.29	7.41	1.76	9.22	2.78	16.61	3.71	21.39	2.65	14.89
1-6	0.72	5.50	1.83	16.04	2.28	10.70	2.74	13.21	2.89	15.22	1.18	7.58
Aide or Asst, 1-10 Stud.	5.01	13.63	4.88	13.38	4.95	14.21	3.02	11.06	2.68	11.47	1.97	7.65
Tutor or Volunt., Individ.	1.06	4.16	1.20	4.59	0.85	3.46	0.82	4.31	0.91	3.65	0.98	4.63
Ind. Work, Programmed Mat.	1.59	7.36	4.30	16.52	3.80	14.29	5.01	16.71	5.91	16.52	4.76	16.98
Ind. Work, Non-Prog. Mat.	59.47	40.84	57.38	33.62	53.82	34.29	47.51	37.41	45.16	34.29	43.10	33.88

Table 4-1

Percentages of Students by Grade Marking Each Response for the Six Items of the Summer Activity Slipsheet. Figures are Based on Projections to the National Population

Item No.	Item Content	Grade 2 %	Grade 3 %	Grade 4 %	Grade 5 %	Grade 6 %
1	Types of summer activities:					
	Did 2 structured activities	5.2	7.3	7.6	6.7	6.5
	Did 1 structured activity	23.0	28.0	29.6	27.5	23.7
	Did 0 structured activities	71.8	64.7	62.8	65.8	69.7
2	No. of comic books read:					
	None	43.3	33.3	32.2	31.5	31.5
	1 or 2	22.4	23.5	24.8	22.3	21.6
	3 to 10	22.8	24.4	18.2	21.0	22.4
	11 to 20	6.2	7.3	7.6	8.8	8.4
	More than 20	5.3	11.5	17.3	16.4	16.2
3	No. of other books read:					
	None	24.3	16.8	14.7	14.2	15.2
	1 or 2	23.4	20.2	18.1	21.2	24.2
	3 or 4	15.1	16.0	15.9	18.5	21.5
	5 or 6	9.5	10.0	10.4	11.7	11.6
	7 or 8	5.6	7.2	6.4	5.9	5.5
	More than 8	22.0	29.9	34.5	28.5	22.1
4	No. of weeks in summer school:					
	0	89.0	88.0	87.9	88.9	91.5
	1	0.8	1.0	1.3	1.1	0.6
	2	1.0	0.9	0.8	0.8	0.5
	3	0.5	0.8	0.9	1.0	0.8
	4	1.2	1.1	1.2	1.6	1.1
	5	1.5	1.3	1.1	1.3	1.0
	6	4.6	4.9	4.3	3.5	3.4
	7	0.3	0.4	0.3	0.3	0.3
	8	0.5	0.4	0.4	0.5	0.2
	9	0.1	0.2	0.5	0.1	0.1
	10	0.3	0.2	0.3	0.2	0.1
	11	0.1	0.2	0.1	0.1	0.0
	12	0.3	0.7	0.9	0.6	0.4
5	Frequency of reading in summer school:					
	Did not attend summer school	89.0	88.0	87.9	88.9	91.5
	Never had reading	1.9	2.3	2.9	3.2	3.0
	About once a week	0.9	1.0	1.0	0.8	0.5
	2 or 3 times a week	2.3	2.5	3.0	2.1	1.2
	Every day	5.9	6.3	5.2	4.9	3.8
6	Frequency of math in summer school:					
	Did not attend summer school	89.0	88.0	87.9	88.9	91.5
	Never had math	3.4	3.4	3.8	4.0	2.9
	About once a week	0.6	0.7	0.9	0.8	0.4
	2 or 3 times a week	2.1	1.9	2.3	1.7	0.9
	Every day	4.8	6.0	5.0	4.6	4.3

Thus, this score can range from 0 to 50 points, with the greatest contribution made by summer school attendance in which math is taught.

Finally, the Summer Intellectual Experience score combines all 6 items:

> score for item 1 (0-2 points) + score for item 2 (0-4 points) + score for item 3 (0-5 points) + [score for item 4 × [score for item 5 + score for item 6 + 1] (0-108 points)].

This total score could then range from 0 to 119 points, with the greatest contribution made by summer school attendance for reading and math, but with some credit given to other kinds of experience too, including attendance at summer school without reading or math instruction.

Table 4-2 presents the means and standard deviations, projected to the population, for each of the three composites at each grade level. The means are low because most students (about 90%) did not attend any summer school.

Table 4-2

Means and Standard Deviations for Composite Scores from the Summer Activity Slipsheet by Grade. Figures are Based on Projections to the National Population

Scale	Grade 2		Grade 3		Grade 4		Grade 5		Grade 6	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Summer Reading Experience	5.37	6.64	6.46	7.20	6.71	7.18	6.18	6.45	5.50	5.77
Summer Math Experience	1.95	5.67	2.32	6.35	2.27	6.31	1.94	5.64	1.61	5.07
Summer Intellectual Experience	7.56	13.39	9.01	14.75	9.19	14.69	8.27	13.11	7.18	11.65

Intercorrelations among the three composite scores are presented in Table 4-3. These correlations are based on subsamples chosen randomly from each grade. The correlations of Reading Experience with Math Experience range from .79 to .88.

Although the alpha reliability coefficient is not appropriate, given the construction of these composites, item total correlations were calculated, using a random subsample of students. These correlations are presented in Table 4-4. As might be expected, the largest of these spurious correlations occurs for the items dealing with summer school experience, while the correlations for the other items are considerably smaller.

STUDENT BACKGROUND CHECKLIST

A Student Background Checklist (SBC) was completed for each student by the homeroom teacher. The teachers were instructed to answer the items on the basis of their own knowledge about the student or from school records, but they could ask the student for information in some instances if necessary.

Table 4-3

Correlations Among the Three Composites of the Summer Activities Slipsheet by Grade.* Figures are Based on Random Subsamples in Grades.

Grade (Sample size)	Scale	1	2	3
Gr. 2*	1. Summer Reading Experience	—		
	2. Summer Math Experience	.88	—	
	3. Summer Intellectual Experience	.97	.97	—
Gr. 3*	1. Summer Reading Experience	—	.87	.97
	2. Summer Math Experience	.80	—	.96
Gr. 4*	3. Summer Intellectual Experience	.95	.94	—
Gr. 5*	1. Summer Reading Experience	—	.85	.95
	2. Summer Math Experience	.79	—	.96
Gr. 6*	3. Summer Intellectual Experience	.95	.94	—

*In the second and third matrices, the coefficients above the diagonal are from the lower grade and those below the diagonal are from the higher grade.

Table 4-4

Item-Total Correlations for the Three Composites of the Summer Activities Slipsheet by Grade. Figures are Based on Random Subsamples of Students

Scale and Items*	Grade 2 N=719	Grade 3 N=725	Grade 4 N=767	Grade 5 N=772	Grade 6 N=817
Summer Reading Experience					
Item 1	.18	.15	.17	.17	.23
2	.29	.32	.28	.29	.30
3	.37	.31	.33	.36	.38
4	.87	.88	.84	.82	.80
5	.81	.81	.79	.75	.78
Summer Math Experience					
Item 1	.15	.13	.11	.13	.19
4	.92	.90	.88	.91	.87
6	.87	.88	.86	.87	.86
Summer Intellectual Experience					
Item 1	.11	.10	.09	.10	.16
2	.18	.21	.14	.11	.15
3	.22	.15	.17	.17	.21
4	.94	.94	.93	.93	.91
5	.83	.83	.83	.80	.84
6	.85	.85	.79	.83	.79

*See Table 4-1 for content of each item.

Tables 4-5, 4-6, and 4-7 present the nationally projected percentages of students in each response category for each item. The items in Table 4-5 deal with basic demographic characteristics, while those in Table 4-6 concern parental involvement in education, and those in Table 4-7 deal with aspects of the student's educational environment. It should be noted that data for a number of SBC items are not presented here, either because they are uninformative in the aggregate (e.g., grade of student, sex of student), or because they are dealt with in detail elsewhere (see Wang et al., 1978).

In addition to the individual items, three composite variables were created: Early Childhood Educational Experience, Economic Status, and Total Parent Involvement. The first composite is based on answers to item 6. If the student participated in any early childhood educational experience, a score of 1 was assigned for this composite; otherwise a score of 0 was assigned.

Table 4-5

Percentage of Students in Each Response Category for Demographic Items from the Student Background Checklist. Percentages are Projections to the National Population

Item No.	Item Content	Percentage of Students in Each Category
5	Student Racial/Ethnic Background:	
	Caucasian/White	77.4
	Black	14.6
	Hispanic	6.2
	Other	1.8
6	Student Early Childhood Experience:	
	Kindergarten and/or pre-kindergarten	84.7
	Head Start	7.1
	Summer school	5.3
	Nursery/day-care center	11.1
	Preschool, excluding day-care center	8.7
15A	Mother's Education:	
	Didn't finish grade school	3.1
	Didn't finish high school	14.8
	Graduated from high school	40.3
	Some college, technical or business school	9.9
	Graduated from 4-year college	7.0
	Post-college advanced degree	0.8
	Cannot estimate	24.1
15B	Father's Education:	
	Didn't finish grade school	3.2
	Didn't finish high school	12.9
	Graduated from high school	31.7
	Some college, technical or business school	10.3
	Graduated from 4-year college	8.4
	Post-college advanced degree	3.1
	Cannot estimate	30.4
16	Language other than English spoken in home	6.7

Table 4-6

Percentage of Students in Each Response Category for Parent-Involvement Items from the Student Background Checklist. Percentages are Projections to the National Population

Item No.	Item Content	Percentage of Students in Each Category
17	Parents have met with teachers to discuss:	
	Discipline problems	9.7
	Academic progress/problems	32.1
	Student's general progress	49.6
18	Parents have come to school for parents day, PTA/PTO, open house, or other formally scheduled events	53.0
19	Number of activities in which parents have participated:	
	0	74.9
	1	16.4
	2	5.9
	3	2.0
	4	0.6
	5	0.2
	6-8	0.0

Table 4-7

Percentages of Students in Each Response Category for Educational-Environment Items from the Student Background Checklist. Percentages are Projections to the National Population

Item No.	Item Content	Percentage of Students in Each Category
12	Level of reading achievement of student's reading class:	
	Mostly high achievement	13.2
	Mostly medium achievement	24.8
	Mostly low achievement	15.3
	Students are of different achievement levels	46.7
13	Level of math achievement of student's math class:	
	Mostly high achievement	11.0
	Mostly medium achievement	26.4
	Mostly low achievement	11.7
	Students are of different achievement levels	50.9
14A	Student has physical, psychological or adjustment problems that interfere with academic performance	11.0
14B	School has provided treatment for student's problems:	
	Does not apply. Student has no problems	89.0
	Yes, school is providing treatment	4.8
	School has provided treatment, but at least one problem is untreated	1.7
	No, school has not provided treatment	4.5

The Economic Status composite was computed as a weighted average of the free-lunch participation indicator (item 7), and the educational backgrounds of both parents (items 15A and 15B). The formula used was:

$$\text{Economic Status} = (119 \times \text{item 7}) + \frac{(52.4 \times \text{item 15A} + \text{item 15B})}{2} - 6.7.$$

The coefficients in this formula are the weights found in the multiple-linear-regression prediction of family income in units of the Orshansky poverty cut-off, which was obtained for a subsample of the students (see Breglio, Hinckley, and Beal, 1978). Values of the Economic Status composite range from 46 to 427, and are interpreted as percentages of the Orshansky poverty level. Thus, scores at or below 100 indicate below-poverty level, while scores above 100 are non-poverty. In the sample of students used for composite construction, this model correctly classified 46 percent of the poverty families and 94 percent of the non-poverty families. However, in the cross-validation study only 33 percent of the poverty families were correctly classified. Thus, although this composite was used in early SES reports, it is not considered sufficiently accurate for use in later reports.

The Total Parent Involvement composite is simply the number of "Yes" responses from items 17, 18 and 19, and thus can range from 0 (no "Yes" responses) to 12 (all responses were "Yes"). It indicates the number of school activities in which the parents were involved, whether positive or negative, and whether related or unrelated to their own children.

The nationally-projected scores for these three composites are shown in Table 4-8. As can be seen, most students (about 89%) have had some early childhood experience, mean economic status is about two and one-third times the Orshansky poverty level, and parental involvement is low (about 2 items out of 12 possible). Note that parental involvement decreases over grade.

In addition to projecting the mean scores for these composites, item-total correlations were calculated for both the parent-involvement and economic-status composites, and the alpha

Table 4-8

Score Characteristics for the Three Composites from the Student Background Checklist. Characteristics are Projected to the National Population

Composite Content*	Score
Student early childhood educational experience (from Item 6)	88.6%
Economic Status – as a percentage of the Orshansky poverty level (from items 7 and 15)	237.1%
Total Parent Involvement (from Items 17, 18, and 19) (Possible Range = 0 to 12)	
Grade 1	2.12
Grade 2	2.04
Grade 3	1.90
Grade 4	1.89
Grade 5	1.82
Grade 6	1.43

*See text for explanation of composites and their scoring.

reliability coefficient was calculated for the parent-involvement composite. Alpha is not an appropriate statistic for the economic-status variable, due to the way in which it is constructed, and neither alpha nor item-total correlations are appropriate for the early-childhood-educational-experience composite. The item-total correlations and alpha were computed using a subsample of students. The results are presented in Table 4-9. As can be seen, the item-total correlations for both composites are quite high. In addition, the alpha for parental involvement is not very high (.55), probably indicating that each parent participates in only one or a few characteristic ways, and not consistently in all possible ways.

Table 4-9

Item-Total Correlations and Reliability Estimates for Two Composites from the Student Background Checklist. Coefficients are Based on a Random Subsample of Students

Composite	Item – Total Correlations	Alpha Coefficient
Total Parent Involvement (N=648)		.55
Item 17A	.48	
Item 17B	.67	
Item 17C	.75	
Item 18	.61	
Item 19	.66	
Economic Status (N=484)		N/A
Item 7	.86	
Item 15A	.78	
Item 15B	.81	

PART II. MEASURES OF TEACHERS AND PROGRAMS

CHAPTER 5. MEASURES OF TEACHER BACKGROUND, SCHOOL ACTIVITIES, TEACHING APPROACHES, AND ATTITUDES

Accurate measurement of the quality of teachers and teaching is, to say the least, not easily accomplished. The use of mailed, self-descriptive, multiple-choice questionnaires for this purpose was viewed merely as an efficient way to obtain basic information related to quality. Three teacher questionnaires were designed to obtain information concerning teacher, school, and classroom program characteristics. The first questionnaire, Part A, is described in this chapter and focuses on teacher and school information. Parts B and C focus on characteristics of reading and math programs, respectively, and are discussed in Chapter 6.

TEACHER QUESTIONNAIRE, PART A

The Teacher Questionnaire, Part A (TQA) is administered once a year to all teachers in the SES schools who teach reading and/or math to students in grades 1-6. All of the data presented on the TQA are unweighted sample-descriptive statistics only, since sampling ratios for teachers, necessary for making population projections, could not be calculated (see Wang et al., 1978).

The data from the TQA are presented on an item-by-item basis, giving both a paraphrased version of the text of the item as it was presented to the teachers, and the appropriate statistical description of the responses (either mean and standard deviation, or percentage of teachers selecting a given response). Where it is felt that such information will be of interest, responses are reported by grade level. In these instances, a teacher's grade level was defined as the grade in which most of his/her students were assigned (e.g., a teacher who had 28 students in grade 3, and 19 students in grade 2 would be assigned a grade level of 3).

The first two items of the TQA, reported in Table 5-1, provide a measure of the teaching experience of 3,412 teachers, while the third item, reported in Table 5-2, deals with how teachers are placed in their respective schools.

Table 5-1

Teaching Experience of Teachers

Item Content		Number of Years
At the end of this school year, how many years will you have been a full-time teacher in any school?	Mean S.D.	11.28 7.84
At the end of this school year, how many years will you have been a full-time teacher in this school?	Mean S.D.	6.87 5.80

Table 5-2

Assignment of Teachers to Schools

Item Content	Percentage of Teachers
How did you happen to be assigned to this particular school rather than some other school in the district?	
I chose to work in this school	46.4
I was placed in this school	51.4
This is the only school in the district for which I am qualified to teach	2.2

The items in Table 5-3 (items 4 and 5) detail the educational background of the teachers in terms of college degree held, and number of courses taken in teaching reading and teaching math. Note that only about 1 percent of the teachers do not have bachelor's degrees, and that the average number of courses taken indicates a considerable incidence of professional-growth and skills-maintenance activities among the teachers for reading, but less for math.

Table 5-3

Educational Background of Teachers, by Grade Level Taught

Item Content		Percentage of Teachers Responding					
		Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
What is the highest earned college degree you hold?							
No degree or degree based on less than 4 year's work		1.6	1.1	1.1	0.6	0.4	1.1
Bachelor's degree		61.0	58.1	58.3	51.5	50.1	48.9
Master's degree, Bachelor's plus 5th year preparation, or 5 year Specialist degree		37.5	40.5	40.3	47.3	49.5	49.8
Doctor's degree		0.0	0.4	0.2	0.6	0.0	0.2
Item Content		**Means and Standard Deviations of Number of Courses**					
During the last three years, how many college-level courses have you taken in teaching reading or math?							
Reading	Mean	1.33	1.22	1.14	1.14	.99	.98
	S.D.	1.64	1.67	1.44	1.61	1.41	1.43
Math	Mean	.44	.49	.52	.58	.55	.58
	S.D.	.86	.98	.92	1.12	1.08	1.05

Table 5-4

Areas in Which Teachers Have Received Inservice Training

Item Content		Means and Standard Deviation o/ Numbers of Areas					
		Gr. 1 (N=630)	Gr. 2 (N=558)	Gr. 3 (=528)	Gr. 4 (N=522)	Gr. 5 (N=467)	Gr. 6 (N=506)
Mark the areas* in which you received staff development/ inservice training in the last three years.							
Reading Areas (0-13)	Mean	2.72	2.77	2.67	2.73	2.34	2.22
	S.D.	2.51	2.60	2.58	2.64	2.45	2.52
Math Areas (0-12)	Mean	1.71	1.81	1.86	1.97	1.76	1.46
	S.D.	2.06	2.17	2.24	2.44	2.27	2.09
Special Instructional Techniques (0-12)	Mean	2.56	2.64	2.43	2.38	2.27	2.05
	S.D.	2.53	2.76	2.69	2.49	2.44	2.29
Total Number of Areas Checked (0-37)	Mean	6.99	7.22	6.96	7.08	6.36	5.72
	S.D.	6.14	6.44	6.51	6.66	6.24	5.74

*Scored as number of areas checked; areas are listed in Teacher Questionnaire, TQA06, in "A Compilation of Instruments Used in the Sustaining Effects Study", the SES Staff, 1979.

Items in Table 5-4 and Table 5-5 (items 6 and 7, respectively) deal with inservice training, and were scored by counting the number of content areas checked by each teacher for reading, math, and special instructional techniques. The means for this item indicate that, on the average, teachers have received inservice training in about 7 of the 37 areas listed, with 2 to 3 of these in reading, 1 to 2 in math, and 2 to 3 in special instructional techniques. Responses to the second item indicate that, on the average, teachers have received about 9 hours of inservice training in reading and 5.5 hours in math over the past three years; however, the large standard deviations here indicate a great deal of variability among teachers in the amount of training received.

Table 5-5

Inservice Training Received by Teachers in Reading/Math Instruction

Item Content	Number of Hours	
	Mean	S.D.
During the last three years, how many hours of staff development, inservice training (sponsored by the school, district, region, or state) have you taken for reading instruction and/or math instruction?		
Reading instruction	9.44	15.12
Math instruction	5.61	11.08

Table 5-6

Teacher Attendance at Non-Compulsory School-Related Meetings

Item Content	Number of Meetings Checked*					
	0	1	2	3	4	5
Where attendance is not compulsory, how many school-related meetings do you attend fairly regularly?	22.0%	27.9%	29.6%	15.2%	4.6%	0.7%

*Types of meetings are listed in "A Compilation of Instruments Used in the Sustaining Effects Study", the SES Project Staff, 1979.

Table 5-6 (item 8) provides a measure of teacher involvement with the school, in terms of voluntary attendance at school-related meetings. Of the 5 types of meetings listed, teachers typically checked 0 to 2, although 20 percent indicated that they attended 3 to 5 of the types listed.

The next three items reported in Table 5-7 (items 9, 10, and 11) deal with the number of hours spent in instructional and non-instructional activities, and the amount of support from non-teaching aides. Typically, teachers spend about 5 hours a day in instructing students, and another 3 hours per day in related non-instructional activities. In addition, teachers have support from non-teaching aides for about 2 hours per week.

Table 5-7

Time Devoted to Instructional and Non-Instructional Activities

Item Content	Number of Hours	
	Mean	S.D.
In a typical day, how many hours do you devote to instructing students?	4.87	0.78
In a typical day, about how many hours do you devote to *non-instructional* activities?		
Preparation for instruction	1.38	0.72
Administration and clerical tasks	0.73	0.59
Interactions with individual parents	0.35	0.34
Other school-related non-instructional activities	0.58	0.57
Total	3.05	1.37
How many hours per week do you have the support of a non-teaching aide to help you in grading papers, updating files, and housekeeping chores?		
Grade 1 teachers (N=630)	1.83	1.37
Grade 2 teachers (N=558)	1.83	1.37
Grade 3 teachers (N=528)	1.86	1.38
Grade 4 teachers (N=522)	1.82	1.40
Grade 5 teachers (N=467)	1.65	1.22
Grade 6 teachers (N=566)	1.75	1.34

Table 5-8

Teacher Ratings of Importance of Factors in Student Academic Performance

Item Content	Percentage of Teachers Rating Each Factor				
	The Most Important	Among More Important	Neutral*	Among the Less Important	The Least Important
In your opinion, how important is each of the following factors in explaining student academic performance?					
Income level of family	0.5	19.2	3.0	46.2	31.1
Home environment	36.7	55.9	2.7	4.4	0.4
Ability level of student	26.8	61.5	3.2	7.9	0.6
Student motivation	40.5	54.0	3.4	2.0	0.1
Adequacy of instructional materials	8.4	58.4	4.0	25.0	4.2
Quality of instruction provided	35.7	56.7	4.4	2.7	0.5

*Teachers were not provided with a 'neutral' alternative. This category was created for missing responses.

The item in Table 5-8 (item 12) is an attitude measure which asks the teachers to indicate how important they think various factors are in explaining student academic performance. Note that teachers place very little importance on the income level of a student's family, but think that the home environment is very important. Apparently, teachers feel that income, by itself, is not a limiting factor if the home environment is good. Note also that teachers do not place a great deal of emphasis on the adequacy of instructional materials as an explanation of student performance, but they do feel that the quality of instruction provided is almost as important as student motivation.

Item 13 in Table 5-9 describes two different approaches to the use of rewards in the classroom and asks each teacher to indicate which description is closest to his/her own approach. About 80 percent selected the second approach (using rewards to establish a warm, accepting climate), rather than the first approach (using rewards for achievement of specific objectives).

Table 5-10 (item 14) presents information about methods used by the teachers to handle disruptive behavior in the classroom. Most frequently, the teachers report that they change the student's seat or provide an alternate activity, rather than to isolate the student or to remove him/her from the classroom.

The item in Table 5-11 (item 28) asks each teacher to indicate his/her employment status. Roughly 96 percent of the teachers say that they have regular, full-time teaching appointments.

Table 5-12 provides information from two items (29 and 30) on the teachers' contract salaries and supplementary incomes. Because over 62 percent of the teachers reported no supplementary income from the school system, Table 5-12 presents the statistics in supplementary income based only on teachers who had such income.

Table 5-9

Teachers' Approaches to the Use of Rewards in the Classroom

Item Content	Percentage of Teachers Responding					
	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
Which of the following statements most nearly describes your own approach to the use of rewards in the classroom?						
I try to offer recognition to students primarily when they achieve specific objectives. I use praise or other rewards mainly to help students acquire academic skills and social behaviors.	21.4	18.8	18.6	22.0	22.9	23.7
I try to establish a warm, accepting climate for all students, giving them praise, affection, and other rewards no matter how well they achieve or, within limits, what they do.	78.6	81.2	81.4	78.0	77.1	76.3

Table 5-10

Teachers' Methods for Handling Disruptive Behavior in the Classroom

Item Content		Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
About how frequently do you use each of the following techniques to handle disruptive classroom behavior? (Responses are scaled ratings of frequency; with 0 = never and the maximum = several times a week.)							
Isolate the student in the classroom (0-4)	Mean	1.93	1.69	1.58	1.56	1.47	1.33
	S.D.	1.33	1.25	1.29	1.24	1.25	1.13
Send student to alternate room or to higher authority (0-8)	Mean	1.07	1.15	1.31	1.32	1.41	1.59
	S.D.	1.07	1.18	1.16	1.12	1.21	1.32
Provide alternate activity or change student's seat (0-8)	Mean	4.04	4.27	4.22	4.15	3.98	4.05
	S.D.	1.76	1.89	1.92	1.73	1.86	1.81

One composite variable was developed from the TQA items: Teacher Experience and Training. This composite is a weighted sum of four of the items, as follows:

	Item	Weight
1	Years of teaching experience (1-28)	1.00
2	Highest degree held (1-4)	1.00
3	No. of Courses in teaching reading (0-6)	1.00
3	No. of Courses in teaching math (0-6)	1.00

4	Hours of inservice training in reading (0-81)	0.25
4	Hours of inservice training in math (0-81)	0.25

Table 5-13 presents the mean and standard deviation for this composite (based on the full sample of teachers), and the item-total correlations (based on a random subsample of the teachers). The item-total correlations indicate that the composite score is dominated, as planned, mostly by years of teaching experience and hours of inservice training.

Table 5-11

Teacher Employment Status

Item Content	Percentage of Teachers Responding					
	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
What is your employment status in this school system?						
Regular full-time teaching appointment	96.7	95.5	96.8	96.7	97.4	95.6
Part-time appointment for teaching less than full school days for school term	1.4	1.4	1.5	1.5	0.6	1.4
Full-time teaching appointment for less than school term	1.6	2.5	1.7	0.8	1.3	1.1
Part-time teacher and part-time administrator	0.3	0.5	0.0	1.0	0.6	1.9

Table 5-12

Teacher Contract Salary and Supplementary Income per Year

Item Content		Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
What is your expected contract salary for teaching in this school system this year? Do not include supplements for extra services.							
	Mean	$12,090	$12,290	$12,278	$12,707	$12,958	$12,332
	S.D.	$ 3,445	$ 3,241	$ 3,335	$ 3,486	$ 3,490	$ 3,409
(Percentage of teachers with non-zero income.)		36.5%	31.7%	33.6%	36.5%	40.8%	46.1%
What is your expected supplementary income from this school system this year? Include pay for extra services, summer school, etc.							
	Mean	$ 106	$ 95	$ 105	$ 127	$ 173	$ 220
	S.D.	$ 244	$ 240	$ 256	$ 289	$ 362	$ 405

Table 5-13

Mean, Standard Deviation, and Item-Total Correlations for the Teacher Composite, "Teacher Experience and Training"

	Teacher Experience and Training	
Mean	19.12	
S.D.	10.19	
Number of items in composite	6	
N for computing correlations and reliabilities	585	
Internal-consistency reliability	.109	
Items* and item-composite correlations	TQA01	.77
	TQA04	.20
	TQA05A	.04
	TQA05B	.07
	TQA07A	.54
	TQA07B	.52

*Items are documented in "A Compilation of Instruments Used in the Sustaining Efforts Study", the SES Staff (1978).

Thirteen items of the TQA (items 15 to 27) provide information about the school rather than about individual teachers. Therefore, these items are presented in Chapter 8, along with other school-level information.

CHAPTER 6. MEASURES OF READING AND MATH PROGRAMS

In Chapter 3 data were presented from instruments that assessed receipt of educational services. The data were primarily in terms of hours of instruction received in different group sizes by different deliverers of instruction. In this chapter the focus is on teacher descriptions of a wide variety of aspects of the programs. Program descriptions come from the Teacher Questionnaire, Parts B and C, for reading and math programs, respectively. Like Part A, Parts B and C are administered once a year, in the winter, to the teachers in the SES sample. It should be noted, however, that only teachers who teach reading were asked to complete Part B, and only those who teach math were asked to complete Part C.

TEACHER QUESTIONNAIRE, PARTS B AND C

Because the TQB and TQC are very similar, the data for both parts are presented together. As in the previous chapter, the information is presented on an item-by-item basis, giving both a paraphrased text of the item and the appropriate statistical description of the teachers' responses (either mean and standard deviation, or percentage of teachers selecting given responses). Where appropriate, the teachers' responses are reported by grade, with grade defined as the grade level of most of the teacher's students. The reader should bear in mind that these data are not projected to the national population, but describe the sample only.

The first item in both TQB and TQC is reported in Table 6-1. It provides a categorization of the reading and math teachers: about 11 percent of the reading teachers and 8 percent of the math teachers can be classified as teachers who specialize in teaching reading or math, while the remainder of the teachers are classified as "regular classroom teachers".

Table 6-1

Percentage of Teachers who are Regular Classroom Teachers or Special Teachers

Item Content	Percentage of Teachers Responding*	
	Reading (N = 3,087)	Math (N = 2,800)
Are you primarily a regular classroom teacher who teaches reading/math or a teacher who specializes in teaching reading/math?		
I am a regular classroom teacher	88.7	92.4
I am a special (reading/math) teacher who provides instruction to students during the regular (reading/math) period for their class	3.9	3.5
I am a special (reading/math) teacher. The instruction I provide is in addition to the instruction that my students receive during their regular (reading/math) period	7.4	4.1

*Missing responses were filled with the modal responses from other teachers at the school.

Table 6-2

Student Assignment to Teachers

Item Content	Percentage of Teachers Responding*					
	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
On what basis were most students assigned to you for instruction?						
Reading						
An achievement test score or teacher judgment	52.5	64.7	66.4	69.0	62.6	65.5
Parent request, student request, or other	47.5	35.3	33.6	31.0	37.4	34.5
Math						
An achievement test score or teacher judgment	42.2	50.9	51.6	54.4	57.1	57.0
Parent request, student request, or other	57.8	49.1	48.4	45.6	42.9	43.0

*Missing responses were filled with the modal response from all other teachers at the school.

Table 6-2 describes the basis on which students are assigned to teachers (item 2). In both reading and math, more emphasis is generally placed on test scores or teacher judgment than on parent and/or student request.

Table 6-3 presents four items that describe the amount of instruction and class sizes for reading and math. In both reading and math, instruction is usually given 5 days a week, but the number of minutes of reading instruction per day is much greater than the number of minutes of math instruction per day. In addition, students who receive instruction from a special reading teacher receive such instruction for a longer period of time than do students who receive special math instruction. Finally, reading class sizes are typically smaller than math class sizes.

Item 6 of TQB has no parallel item in TQC. Table 6-4 describes the level of texts used by the students when they read in subject matter areas such as social studies and science. The majority of teachers responded that the texts are at the student's grade level. Note that only a small percentage of teachers (3% to 8%) said that all the texts were at the students' reading achievement level.

Table 6-5 presents three items from both the TQB and TQC that deal with the amount of the teachers' planning and related activities. Reading teachers state that they spend about 13 to 16 hours per year in activities related to curriculum development, while math teachers spend somewhat less time (about 12 hours). Reading teachers estimate that they spend about 20 to 23 hours per year in doing needs assessment, planning, and program evaluation, while math teachers estimate this time at about 19 to 20 hours. Finally, the majority of both reading and

Table 6-3

Amount of Instruction and Class Size

Item Content		Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
Reading							
w many days per week do your student eive reading instructio?	Mean	4.95	4.91	4.92	4.87	4.88	4.77
	S.D.	.33	.48	.39	.46	.43	.62
how many minutes per day does your ss (or typical group, if you are a special ding teacher) receive reading instruction?	Mean	80.87	76.13	64.82	56.93	54.98	53.01
	S.D.	33.48	32.74	26.39	20.87	18.35	18.19
hen your students receive instruction from pecial reading teacher, how many weeks year do they typically receive such vices? If you are a special reading teacher, w many weeks per year do you typically ovide se vices to students who have been ferred? (Respor ses not tabulated for DNA.)	Mean	32.04	33.83	33.35	33.01	30.87	26.56
	S.D.	9.03	7.24	7.72	8.28	10.54	12.67
rcentage responding "does not apply", cause their students do not receive special truction.		44.4%	26.2%	27.9%	26.9%	33.5%	29.9%
the average, how many students are in ur instructional reading class (or typical structional group if you are a special ading teacher)	Mean	16.60	16.27	18.04	19.10	20.68	21.03
	S.D.	9.44	9.27	9.53	9.63	9.00	9.17
Math							
ow many days per week do your students ceive math instruction?	Mean	4.87	4.91	4.92	4.93	4.91	4.91
	S.D.	.51	.39	.40	.44	.45	.42
r how many minutes per day does your ass (or typical group, if you are a special ath teacher) receive math instruction?	Mean	42.81	43.57	47.26	47.98	49.01	49.53
	S.D.	14.47	12.96	13.51	11.46	12.18	13.07
/hen your students receive instruction from special math teacher, how many weeks per ear do they typically receive such services? you are a special math teacher, how many eeks per year do you typically provide ervices to students who have been eferred to you? (Responses not tabulated DNA.)	Mean	24.39	23.84	26.52	25.42	25.58	19.89
	S.D.	13.32	13.63	12.56	13.04	13.04	13.15
ercentage responding "does not apply", ecause their students do not receive special nstruction.		71.3%	64.2%	59.4%	55.9%	53.0%	44.5%
On the average, how many students are in your instructional math class (or typical nstructional group if you are a special math eacher)?	Mean	21.63	22.35	23.00	23.33	23.68	23.89
	S.D.	7.75	7.55	7.57	7.90	7.86	8.07

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Table 6-4

Level of Texts Used for Reading in Subject Areas

Item Content	Percentage of Teachers Responding					
	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
When students in your instructional group read for subject matter areas (i.e., outside formal reading instruction) such as social studies, science, health, etc., what textbooks do they use?						
Texts at the students' grade level	43.6	54.6	65.6	65.2	65.6	59.1
Differs according to subject area. For some subjects, texts are at the students' grade level; for other subjects, texts are at the students' reading achievement level.	11.6	19.1	20.4	25.6	28.4	32.9
Texts at the students' reading achievement level.	4.2	7.5	6.1	4.6	3.3	6.0
Students use no texts for these subjects.	40.5	18.8	7.9	4.6	2.6	2.0

math teachers state that they prepare lesson plans based on broad objectives, although a substantial number of teachers report that they prepare detailed lesson plans with specific objectives.

Responses to item 11 in TQB and item 10 in the TQC are presented in Table 6-6. These items asked the teachers to estimate the achievement level of their students. They were scored to obtain both an estimate of achievement level and an estimate of whether or not achievement levels are mixed within groups of students. The plurality of teachers stated that their students were a mixture of at, below, and above grade level, with a substantial minority of teachers saying that their students were below grade level. Mixing of achievement levels occurs for about two-thirds of both the reading and math teachers.

Table 6-7 presents information related to instructional grouping practices from TQB items 12, 13, and 14 and from TQC items 11, 12, and 13. From 9 to 24 percent of reading teachers (note the increase across grades) do not form subgroups for reading instruction, compared with 32 to 42 percent of math teachers (note decrease across grades). The most common basis for subgrouping in both reading and math is teacher judgment of achievement level, although mastery of specific objectives is also a common basis. The most common types of groups in both reading and math are (1) children in a single grade who are at about the same level, and (2) children in a single grade who are at different levels. Finally, in reading, the composition of the subgroups changes about 4 to 6 times a year, while in math changes occur about 9 to 11 times a year.

Item 15 of TQB and item 14 of TQC, presented in Table 6-8, ask the teachers how frequently they provide various kinds of feedback to their students. The three types of feedback de-

Table 6-5

Amount of Curriculum Development, Planning, Assessment, Evaluation, and Lesson Planning by Reading/Math Teachers

Item Content		Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
Reading							
imate how many hours you will spend ring this school year participating in ivities related to reading riculum development.	Mean S.D.	15.91 10.83	15.36 11.05	13.64 10.83	13.69 10.59	12.90 10.83	13.43 11.01
imate how many hours you will devote to dents' reading needs assessment, planning, d reading program evaluation during this hool year.	Mean S.D.	23.26 7.82	22.57 8.22	22.01 8.53	21.69 8.81	21.27 9.04	20.35 9.53
you use lesson plans for each day's truction in reading?							
I use detailed lesson plans that contain specific objectives and activities for each day's instruction.		44.0%	43.7%	45.8%	38.2%	37.4%	29.3%
I use lesson plans that provide broad objectives and categories of activities for each day's instruction.		53.1%	51.0%	49.3%	56.1%	58.3%	64.2%
find that letting students' interests and pressed needs dictate classroom activities preferable to creating lesson plans in dvance.		2.9%	5.3%	4.9%	5.6%	4.3%	6.5%
Math							
timate how many hours you will spend uring this school year participating in ctivities related to math curriculum evelopment.	Mean S.D.	12.17 10.51	12.28 10.73	11.39 10.51	11.84 10.47	11.69 10.55	12.51 10.78
timate how many hours you will devote to tudents' math needs assessment, planning, nd math program evaluation during this chool year.	Mean S.D.	19.36 9.33	19.74 9.50	19.42 9.91	19.75 9.60	20.53 9.26	19.48 9.94
Do you use lesson plans for each day's nstruction in math?							
I use detailed lesson plans that contain specific objectives and activities for each day's instruction.		39.1%	42.2%	41.8%	39.3%	41.1%	44.2%
I use lesson plans that provide broad objectives and categories of activities for each day's instruction.		57.6%	54.0%	53.3%	56.4%	52.6%	51.2%
I find that letting student's interests and expressed needs dictate classroom activities is preferable to creating lesson plans in advance.		3.3%	3.7%	4.9%	4.3%	6.4%	4.5%

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Table 6-6

Achievement Level of Reading/Math Teachers' Students

Item Content	Percentage of Teachers Responding					
	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
Reading						
How do you rate the current reading achievement level of your students?						
Almost all are below grade level	14.1	20.4	19.4	23.5	20.6	22.4
Some are at grade level, and some below grade level	17.3	18.2	17.7	15.1	13.3	11.9
Almost all are at grade level.	13.4	10.7	8.3	8.2	10.2	8.5
Some are above, some at, and some below grade level	49.2	43.4	44.4	45.1	46.2	45.6
Some are above grade level, and some at grade level	3.3	3.6	5.57	4.0	3.3	5.1
Almost all are above grade level	2.8	3.6	4.7	4.0	6.4	6.5
Percentage of teachers with students of varied achievement levels	69.8	65.2	67.6	64.2	62.8	62.6
Math						
How do you rate the current math achievement level of your students?						
Almost all are below grade level	9.8	11.0	14.1	16.7	15.3	18.8
Some are at grade level, and some below grade level	18.6	16.1	16.8	14.9	16.1	12.0
Almost all are at grade level.	21.5	22.9	17.2	14.2	15.0	11.8
Some are above, some at, and some below grade level	41.5	39.8	41.4	45.6	46.2	48.7
Some are above grade level, and some at grade level	6.3	7.2	6.4	5.0	3.8	4.5
Almost all are above grade level	2.3	2.9	4.1	3.6	3.6	4.2
Percentage of teachers with students of varied achievement levels	66.4	63.1	64.6	65.5	66.1	65.2

Table 6-7

Instructional Grouping Practices in Reading/Math

Item Content		Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
Reading							
If you create subgroups for your reading instruction, on what basis do you usually select students for each subgroup?							
Does not apply. I do not form subgroups*		9.3%	11.3%	16.1%	16.1%	23.5%	23.7%
Reading achievement in a prior class or grade		3.4%	14.8%	18.1%	17.1%	18.2%	18.8%
General aptitude tests (e.g., IQ test)		1.6%	1.5%	2.4%	3.6%	1.2%	2.9%
My judgment of child's current overall reading achievement		58.0%	44.6%	40.5%	38.0%	35.3%	29.3%
Characteristics unrelated to reading		0.2%	0.7%	0.4%	0.0%	0.2%	0.9%
Student self-selection		0.0%	0.2%	0.2%	0.6%	1.4%	1.1%
Mastery of specific reading objectives		27.5%	27.0%	22.4%	24.5%	20.1%	23.3%
If your students are divided into reading subgroups, which of the following kinds of subgroups do you create?							
Does not apply. I do not form subgroups*		9.3%	11.8%	15.9%	15.9%	23.5%	23.3%
Children in a single grade who read at about the same level		47.9%	44.4%	35.2%	36.0%	33.6%	34.5%
Children in a single grade who read at different levels		32.2%	29.9%	32.8%	26.2%	26.8%	28.6%
Children in different grades who read at about the same level		5.7%	7.1%	10.4%	14.5%	13.3%	11.0%
Children in different grades who read at different levels		0.5%	2.0%	1.8%	3.4%	0.9%	1.1%
Children in an ungraded class who read at about the same level		2.8%	2.9%	2.0%	1.2%	0.2%	0.9%
Children in an ungraded level who read at different levels		1.6%	1.8%	2.0%	2.8%	1.7%	0.7%
If your students are organized into subgroups for reading, how many times per year does the composition of the subgroups change? (Tabulations based only on teachers form subgroups.)	Mean	5.40	4.76	4.61	4.09	5.49	5.83
	S.D.	6.04	6.89	7.00	5.81	8.37	8.45

Table 6-7 (Continued)

Math							
If you create subgroups for your math instruction, on what basis do you usually select students for each subgroup?							
Does not apply. I do not form subgroups*		41.5%	42.4%	38.6%	32.3%	33.4%	34.2%
Math achievement in a prior class or grade		0.9%	5.0%	7.2%	4.7%	5.1%	5.5%
General aptitude tests (e.g., IQ tests)		0.4%	0.4%	1.1%	0.7%	1.3%	1.2%
My judgment of child's current overall math achievement		32.4%	25.5%	26.4%	31.6%	31.9%	25.7%
Characteristics unrelated to math		0.4%	0.0%	0.2%	0.0%	0.8%	0.0%
Student self-selection		0.0%	0.0%	0.0%	0.0%	0.3%	1.0%
Mastery of specific math objectives		24.5%	26.7%	26.4%	30.7%	27.3%	32.2%
If your students are divided into math subgroups, which of the following kinds of subgroups do you create?							
Does not apply. I do not form subgroups*		41.3%	42.2%	39.4%	32.3%	33.4%	34.5%
Children in a single grade who are at about the same level in math		29.2%	28.4%	27.9%	29.1%	30.4%	32.5%
Children in a single grade who are at different levels in math		23.1%	20.9%	22.6%	23.5%	27.8%	24.0%
Children in different grades who are at about the same level in math		2.1%	4.1%	5.3%	8.6%	5.9%	5.5%
Children in different grades who are at different levels in math		0.9%	1.7%	0.9%	1.8%	1.5%	1.0%
Children in an ungraded class who are at about the same level in math		1.9%	2.5%	2.6%	1.6%	0.5%	0.7%
Children in an ungraded level who are at different levels in math		1.4%	0.2%	1.3%	3.2%	0.5%	1.7%
If your students are organized into subgroups for math, how many times per year does the composition of the subgroups change? (Tabulations based only on teachers who form subgroups.)	Mean	8.68	9.18	10.58	9.87	10.99	10.49
	S.D.	10.84	11.83	12.57	11.63	12.30	12.00

*Inconsistencies between percentages of 'does not apply' responses within reading and within math reflect actual response inconsistencies of the teachers.

Table 6-8

Frequency of Feedback to Students in Reading/Math

Item Content		Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
Reading							
How many times per semester do you provide your reading students with each of the following types of information about how well they are doing?							
A letter or number grade	Mean	32.7	34.6	35.2	31.7	33.1	29.0
	S.D.	39.9	38.4	35.7	31.2	29.9	28.3
Information about particular strengths	Mean	48.9	47.3	41.8	38.0	31.3	30.3
	S.D.	35.5	34.9	32.8	32.3	29.0	29.4
Information about particular weaknesses	Mean	44.2	44.4	41.2	36.8	29.3	28.7
	S.D.	34.8	34.8	33.0	32.0	27.8	27.5
Total (sum of 3 sub-items)	Mean	125.9	126.3	118.2	106.5	93.7	88.0
	S.D.	84.5	83.5	80.8	74.8	69.2	65.8
Math							
How many times per semester do you provide your math students with each of the following types of information about how well they are doing?							
A letter or number grade	Mean	39.8	44.6	45.5	40.2	45.4	43.2
	S.D.	40.9	38.5	36.6	33.8	3[illegible].1	33.2
Information about particular strengths	Mean	49.2	48.2	43.5	45.7	38.8	38.2
	S.D.	35.8	33.6	32.4	31.9	31.4	30.8
Information about particular weaknesses	Mean	47.2	46.5	44.3	46.3	39.4	38.7
	S.D.	35.5	33.8	32.6	32.5	31.5	30.6
Total (sum of 3 sub-items)	Mean	136.2	139.3	133.3	132.1	123.6	120.1
	S.D.	86.6	81.9	79.2	74.5	71.8	72.2

scribed are all of about equal frequency. Notice that total frequency decreases with increasing grade in both reading and math.

Items TQB16 and TQC15, presented in Table 6-9, provide a measure of individualization of instruction. Only "expected rate of progress" and "teaching method" show a large number of teachers responding that they "tend to vary among students", although, in reading only, "types of instructional materials" also varies for about two-thirds of the teachers. In general, there appears to be much less individualization of math instruction.

Table 6-10 presents responses to items TQB17 and TQC16. These items ask the teachers to indicate whether the content they teach is based on the approved curriculum, or on individual needs. For both reading and math, more teachers use individual needs assessment for their low-achieving students than for their regular students, but overall the least commonly employed method for selecting the content of instruction is 'almost entirely on individual needs'.

Table 6-9

Individualization of Reading/Math Instruction

Item Content	Percentage of Teachers Responding 'Same'					
	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
To what extent are the following aspects of your (reading/math) instruction basically the same for all or most of your students?						
Total time spent in reading activities	67.6	72.5	67.6	73.2	73.2	73.4
Total time spent in math activities	75.0	78.7	74.0	76.3	76.8	78.2
Reading instructional objectives	46.2	43.9	43.8	44.7	44.3	48.5
Math instructional objectives	62.9	64.2	62.5	60.0	58.7	57.5
Sequence of reading learning activities	51.1	46.1	48.7	49.1	51.4	49.0
Sequence of math learning activities	66.5	70.4	64.8	62.3	60.2	58.5
Expected rate of reading progress	4.7	6.2	9.6	8.9	11.8	12.1
Expected rate of math progress	13.1	14.5	14.7	14.9	15.6	17.2
Reading teaching method	27.0	24.4	29.9	32.2	33.2	41.6
Math teaching method	41.2	44.5	46.1	42.9	42.3	45.2
Types of reading instructional materials	37.7	29.5	33.0	35.4	38.9	41.2
Types of math instructional materials	55.2	54.5	56.7	54.4	50.3	55.0

Table 6-11 (items TQB18 and 19) indicates how often regular and low-achieving students engage in specific reading activities, and Table 6-12 (items TQC17 and 18) presents similar information for math activities. Generally, the trends are for low-achieving students to spend more time on basic skills, and less time on more advanced skills than do regular students.

Item 20 from the TQB (which has no parallel TQC item), is presented in Table 6-13. This item asks reading teachers to indicate what approaches they use to teach reading to their regular and low-achieving students. As can be seen, there are only small differences between regular and low achievers in the approaches used.

The amount of homework assigned to regular and low-achieving students is the focus of items TQB21 and TQC19, presented in Table 6-14. Generally, the average hours of homework assigned per week is small, but increases over grades, with slightly less homework being assigned to low-achievers, compared with regular students. (It is interesting to note that, while teachers claim to assign less homework to low-achieving students, Hinckley (1978) reports that parents of low-achieving students report that their children bring home more homework than do the parents of regular-achieving students.) In addition, Table 6-14 presents item TQB22 (no parallel item in TQC), dealing with the amount of time spent in reading-related activities. The amount of time varies from 37 to 53 minutes per day, with very little difference between regular and low-achieving students.

Table 6-15 describes a set of items relating to assistance provided by special personnel in reading and math activities. Generally, special reading or math teachers, teaching aides, and psychologists are used more often for low-achieving students than for regular students, while student teachers, speech therapists, and media specialists are used more often for regular students. The standard deviations accompanying the mean hours in Table 6-15 are not reported, but they are all large in comparison to their means.

Items TQB25 and 26 and TQC22 and 23, in Table 6-16, describe the use of various types of equipment by teachers and aides. There do not appear to be any consistent differences in equipment use for regular students compared with low-achieving students. The table also presents similar results obtained for the use of equipment by the students themselves.

Items TQB29 and TQC26, in Table 6-17, describe the use of various materials by regular and low-achieving students. Again, there are no clear differences between regular and low-achieving students.

The last three items in both questionnaires (TQB items 30, 31, and 32, and TQC items 27, 28, and 29) measure school characteristics and will, therefore, be presented in Chapter 8, along with other school-level items.

Two groups of composite variables were created from the items in TQB and TQC. The first group consists of two composites: Individualized Instructional Approach in Reading, and Individualized Instructional Approach in Math. These composites are weighted sums of specially coded or scaled responses to a number of items, as follows:

Individualized Instructional Approach in Reading:

Items About Reading	Weight
Degree of variation in levels of texts used	1.00
Content relevance of criteria for creating subgroups	1.00
Degree of achievement homogeneity of subgroups	1.00
Frequency of changes in subgroups	0.10
Degree of variation in time among students	1.00
Degree of variation in instructional objectives among students	1.00
Degree of variation in sequence of activities among students	1.00
Degree of variation in expected rate of progress among students	1.00
Degree of variation in teaching method among students	1.00
Degree of variation in instructional materials among students	1.00
Individualization of content for regular achievers	1.00
Individualiation of content for low achievers	1.00
Difference in teaching approaches for different students	1.00

Individualized Instructional Approach in Mathematics:

Items About Math	Weight
Degree of variation in levels of texts used	1.00
Content relevance of criteria for creating subgroups	1.00
Degree of achievement homogeniety of subgroups	1.00
Frequency of changes in subgroups	0.10
Degree of variation in time among students	1.00
Degree of variation in instructional objectives among students	1.00
Degree of variation in sequence of activities among students	1.00
Degree of variation in expected rate of progress among students	1.00
Degree of variation in teaching method among students	1.00
Degree of variation in instructional materials among students	1.00
Individualization of content for regular achievers	1.00
Individualization of content for low achievers	1.00

Means and Standard Deviations for these two composites were calculated using the full sample of teachers. In addition, a subsample of teachers was selected randomly to compute the item-total correlations. These data are presented in Table 6-18.

The second group of composites deals with the frequency of exposure to a variety of audio-visual equipment. Four composites were developed: one for regular reading students, one for low-achieving reading students, one for regular math students, and one for low-achieving math students. The items for the four composites are listed below. Because parallel items and the same weights were used for the composites, they are listed only once.

Frequency per Month of Audio-Visual Exposure

Items for the Four Composites	Weight
Frequency of use per month of sound equipment by staff	1.00
Frequency of use per month of projectors by staff	1.00
Frequency of use per month of sound projectors by staff	1.00
Frequency of use per month of special machines by staff	1.00
Frequency of use per month of TV by staff	1.00
Frequency of use per month of sound equipment by students	1.00
Frequency of use per month of viewers by students	1.00
Frequency of use per month of sound projectors by students	1.00
Frequency of use per month of feedback machines by students	1.00
Frequency of use per month of study carrels by students	1.00
Frequency of use per month of special machines by students	1.00

Means, standard deviations for the full sample of teachers, and item-total correlations based on a sub-sample are presented in Table 6-18. The means for low-achieving students are higher than for regular students, but the large standard deviations indicate great variability for all four groups of students.

Table 6-10

Basis for the Content of Reading/Math Instruction

Item Content			Percentage of Teachers Responding					
			Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
Which of the following statements best characterizes your reading/math instruction for your regular- and your low-achieving (reading/math) students?								
The content I teach this group is based almost entirely on the approved curriculum as outlined by the textbook.	Reading	Regular achieving	47.6	47.2	46.1	44.4	45.0	45.4
		Low achieving	17.8	23.3	19.5	17.9	21.6	19.7
	Math	Regular achieving	54.4	52.6	47.0	44.9	42.9	47.4
		Low achieving	28.7	34.9	26.8	22.1	25.0	23.5
The content I teach this group is based almost entirely on individual needs as determined by pre-assessment on a test that diagnoses specific skill deficiencies.	Reading	Regular achieving	7.8	6.9	7.5	10.2	10.8	13.7
		Low achieving	22.9	22.3	26.1	28.0	24.2	29.1
	Math	Regular achieving	5.0	6.2	8.4	10.5	9.3	10.9
		Low achieving	15.1	15.5	19.2	21.0	20.9	26.5
The content I teach this group is based on some content from textbook-based curriculum and some content based on individual needs as determined by pre-assessment.	Reading	Regular achieving	44.6	45.9	46.4	45.4	44.2	41.8
		Low achieving	59.2	54.4	54.3	54.2	54.2	51.2
	Math	Regular achieving	41.0	41.1	44.6	44.6	47.8	41.0
		Low achieving	56.2	49.6	54.0	56.9	54.1	50.0

Table 6-11

Reading Activities for Regular and Low-Achieving Reading Students

Item Content		Grade 1 Mean	S.D.	Grade 2 Mean	S.D.	Grade 3 Mean	S.D.	Grade 4 Mean	S.D.	Grade 5 Mean	S.D.	Grade 6 Mean	S.D.
During the past month, how often did your reading students engage in the following activities? (5 = frequently; 3 = sometimes; 1 = rarely or never) (Tabulations based only on teachers responding for regular low-achievers)													
Identifying and practicing letter-sound correspondence	Regular-achievers	4.8	0.7	4.3	1.1	3.7	1.4	3.3	1.4	2.9	1.4	2.5	1.3
	Low-achievers	4.8	0.7	4.7	0.8	4.4	1.2	4.1	1.3	3.7	1.3	3.5	1.4
Identifying and writing letters or groups of letters	Regular-achievers	4.5	1.0	4.0	1.3	3.4	1.5	2.9	1.4	2.5	1.4	2.3	1.3
	Low-achievers	4.7	0.8	4.4	1.0	4.0	1.4	3.6	1.4	3.2	1.4	3.1	1.5
Blending the sounds letters stand for to form words	Regular-achievers	4.6	0.9	4.5	1.0	3.9	1.2	3.4	1.3	3.0	1.3	2.6	1.3
	Low-achievers	4.2	1.3	4.6	0.9	4.4	1.0	4.1	1.2	3.9	1.3	3.6	1.3
Learning and practicing sight words	Regular-achievers	4.5	1.0	4.2	1.2	3.8	1.2	3.3	1.4	3.1	1.4	2.9	1.4
	Low-achievers	4.2	1.3	4.5	0.9	4.4	1.1	4.0	1.3	3.8	1.3	3.7	1.3
Dividing words into syllables	Regular-achievers	2.3	1.4	3.6	1.3	4.0	1.1	3.9	1.1	3.7	1.1	3.5	1.1
	Low-achievers	1.8	1.3	2.7	1.5	3.2	1.4	3.6	1.3	3.8	1.3	3.7	1.2
Using context clues to gain meaning	Regular-achievers	4.1	1.1	4.2	1.1	4.3	1.0	4.3	1.0	4.3	1.0	4.2	1.0
	Low-achievers	3.5	1.5	4.0	1.2	3.9	1.2	3.9	1.2	4.0	1.1	4.0	1.1
Answering questions on comprehension	Regular-achievers	4.5	0.8	4.6	0.9	4.5	0.9	4.5	0.9	4.6	0.8	4.5	1.0
	Low-achievers	3.8	1.4	4.2	1.1	4.2	1.1	4.2	1.2	4.2	1.1	4.2	1.1
Reading and writing stories created by students	Regular-achievers	2.7	1.3	3.2	1.2	3.2	1.2	3.1	1.2	3.4	1.2	3.2	1.3
	Low-achievers	2.2	1.4	2.5	1.3	2.6	1.3	2.7	1.2	2.9	1.3	2.7	1.3
Reading texts orally	Regular-achievers	4.6	0.9	4.4	1.0	4.1	1.1	3.7	1.3	3.7	1.2	3.3	1.2
	Low-achievers	4.1	1.4	4.4	1.1	4.2	1.2	3.9	1.3	3.9	1.2	3.7	1.3

Table 6-11 (Continued)

Answering comprehension questions on timed readings	Regular-achievers	1.9	1.3	2.4	1.4	2.5	1.4	2.6	1.4	2.7	1.4	2.6	1.3
	Low-achievers	1.7	1.2	2.1	1.4	2.2	1.3	2.4	1.4	2.4	1.4	2.4	1.3
Alphabetizing	Regular-achievers	2.3	1.3	3.7	1.1	3.8	1.1	3.5	1.2	3.2	1.2	2.8	1.2
	Low-achievers	1.9	1.3	3.0	1.3	3.4	1.3	3.4	1.2	3.4	1.2	3.3	1.3
Using reference materials (dictionaries, encyclopedias)	Regular-achievers	1.8	1.1	2.8	1.3	3.5	1.2	3.9	1.1	4.1	1.0	4.0	1.1
	Low-achievers	1.6	1.0	2.1	1.2	2.5	1.3	3.0	1.3	3.4	1.2	3.5	1.2

Table 6-12

Math Activities for Regular and Low-Achieving Math Students

Item Content		Grade 1 Mean	S.D.	Grade 2 Mean	S.D.	Grade 3 Mean	S.D.	Grade 4 Mean	S.D.	Grade 5 Mean	S.D.	Grade 6 Mean	S.D.
During the past month, how often did your math students engage in the following activities? (5 = frequently; 3 = sometimes; 1 = rarely or never) (Tabulations based only on teachers responding for regular/low achievers)													
Learning math vocabulary	Regular-achievers	3.8	1.2	3.7	1.1	3.7	1.1	3.5	1.1	3.6	1.1	3.6	1.1
	Low-achievers	3.6	1.2	3.6	1.2	3.5	1.2	3.3	1.2	3.4	1.2	3.3	1.1
Solving word problems	Regular-achievers	2.4	1.3	3.4	1.1	3.5	1.1	3.5	1.0	3.4	1.0	3.4	1.0
	Low-achievers	2.2	1.3	3.0	1.2	3.2	1.2	3.1	1.2	3.0	1.2	3.0	1.1
Learning symbols	Regular-achievers	4.1	1.1	3.7	1.1	3.6	1.1	3.4	1.1	3.4	1.1	3.4	1.1
	Low-achievers	4.0	1.2	3.8	1.2	3.5	1.2	3.3	1.2	3.2	1.2	3.2	1.1
Learning properties and axioms	Regular-achievers	2.2	1.4	2.4	1.3	2.5	1.3	2.7	1.3	2.7	1.2	2.8	1.2
	Low-achievers	1.9	1.2	2.0	1.2	2.2	1.2	2.2	1.2	2.2	1.2	2.4	1.1
Learning about number sentences	Regular-achievers	4.2	1.2	4.2	1.0	3.8	1.1	3.5	1.2	3.2	1.1	3.1	1.1
	Low-achievers	3.8	1.4	3.9	1.3	3.6	1.2	3.4	1.2	3.0	1.2	2.9	1.2

Table 6-12 (Continued)

Learning about sets	Regular-achievers	[illegible]	1.2	3.6	1.3	3.5	1.3	2.8	1.3	2.6	1.2	2.6	1.2
	Low-achievers	4.2	1.1	3.7	1.4	3.5	1.3	2.9	1.3	2.5	1.3	2.4	1.3
Learning geometric concepts	Regular-achievers	2.8	1.2	2.7	1.1	2.6	1.1	2.5	1.2	2.7	1.2	2.7	1.3
	Low-achievers	2.6	1.3	2.4	1.1	2.3	1.2	2.1	1.2	2.2	1.2	2.2	1.2
Learning about measurement	Regular-achievers	2.6	1.2	2.8	1.1	2.9	1.1	2.8	1.2	2.9	1.2	3.0	1.2
	Low-achievers	2.3	1.2	2.6	1.1	2.7	1.2	2.6	1.1	2.6	1.2	2.8	1.2
Learning about number theory	Regular-achievers	1.6	1.1	1.8	1.2	2.5	1.4	2.7	1.3	3.1	1.3	3.4	1.3
	Low-achievers	1.5	1.0	1.7	1.1	2.1	1.3	2.1	1.2	2.4	1.3	2.6	1.3
Learning about fundamental operations	Regular-achievers	4.0	1.5	4.2	1.2	4.2	1.1	4.3	1.1	4.4	0.9	4.2	1.1
	Low-achievers	3.8	1.5	4.1	1.3	4.1	1.2	4.3	1.1	4.4	1.0	4.4	1.0
Learning about the structure of number systems	Regular-achievers	2.9	1.6	2.9	1.4	3.1	1.4	3.1	1.4	3.1	1.3	3.1	1.2
	Low-achievers	2.7	1.5	2.8	1.4	2.9	1.4	2.9	1.4	2.9	1.4	2.8	1.4
Reviewing computational skills	Regular-achievers	4.0	1.4	4.3	1.1	4.4	0.9	4.4	1.0	4.3	1.0	4.2	1.0
	Low-achievers	3.9	1.5	4.2	1.3	4.4	1.1	4.5	1.1	4.5	1.0	4.5	0.9
Working with math games	Regular-achievers	3.6	1.[illegible]	3.5	1.0	3.3	1.1	3.2	1.1	3.0	1.1	2.8	1.1
	Low-achievers	3.8	1.3	3.4	1.2	3.5	1.2	3.4	1.3	3.2	1.3	3.0	1.2
Working with physical models	Regular-achievers	2.8	1.5	2.6	1.2	2.4	1.2	2.3	1.1	2.2	1.1	2.2	1.1
	Low-achievers	3.0	1.6	2.8	1.5	2.7	1.4	2.5	1.3	2.4	1.3	2.5	1.3

Table 6-13

Approaches Used to Teach Reading to Regular and Low-Achieving Students

Item Content	Responses Alternatives	% of Teachers of Regular Reading Students						% of Teachers of Low-achieving Students					
		Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
Described below are 10 approaches to teaching reading. Please indicate the extent to which you use each approach when you teach reading to regular and low-achieving students.													

Table 6-13 (Continued)

An approach that uses a graded reading series containing a vocabulary based upon words that occur frequently in the language. New words are introduced by sight and by a phonic analysis presenting the letter-sound relationships of consonants and then those of vowels.	Not used	11.5	18.1	20.1	21.2	24.5	36.0	17.7	20.0	18.2	22.9	21.7	32.4
	Secondary approach	13.0	17.4	17.1	20.7	25.3	23.3	16.7	20.5	21.3	20.0	27.4	23.1
	Major approach	75.4	64.5	62.8	58.1	50.1	40.7	65.5	59.5	60.5	57.1	50.9	44.5
An approach that uses a graded reading service containing a vocabulary based primarily upon words that are regularly spelled. The most common patterns, those containing short vowels, appear first, a typical sentence in an early reader being: Nat is a fat cat. Gradually more complicated, less frequent patterns are introduced. New words are learned by analysis of spelling patterns or by sounding/blending.	Not used	52.3	48.8	56.8	56.7	50.7	62.1	48.2	41.3	39.7	39.8	40.7	51.2
	Secondary approach	30.0	28.0	26.9	28.8	30.4	25.8	27.8	30.1	32.0	34.2	28.9	30.1
	Major approach	17.7	23.2	16.2	14.5	18.9	12.1	24.0	28.6	28.3	26.0	30.4	18.8
An approach that uses a graded reading series containing vocabulary that rapidly introduces the letter-sound relationships of all the sounds in the language. Long and short vowels are introduced at onset. New words are learned by sounding and blending.	Not used	49.5	40.2	33.3	35.5	38.7	48.9	55.8	45.5	37.9	35.9	37.3	43.6
	Secondary approach	25.5	23.9	26.5	29.1	34.5	32.0	22.6	25.5	29.0	30.4	35.5	31.8
	Major approach	25.0	35.9	38.1	35.5	26.7	19.1	21.6	29.0	33.1	33.7	27.1	24.6
A self-instructional approach that uses a series that presents material in "frames" containing small bits of information to which the children are asked to respond. Immediate confirmation as to the correctness of their answers in the text.	Not used	84.9	80.6	81.5	79.6	77.2	74.2	81.7	77.5	76.2	72.3	73.8	67.6
	Secondary approach	10.4	13.3	12.1	15.0	17.3	19.4	12.5	16.1	17.8	18.1	19.0	24.0
	Major approach	4.7	6.0	6.4	5.4	5.6	6.5	5.8	6.5	6.1	9.6	7.2	8.4

Table 6-13 (Continued)

An approach in which children select their own reading materials, such as library-type books, and receive instruction primarily through teacher-child conferences.	Not used	75.2	69.5	63.0	60.6	54.3	45.2	78.2	73.5	66.8	61.4	63.0	52.0
	Secondary approach	22.2	25.4	32.0	31.8	35.1	39.0	19.0	21.7	29.7	31.6	28.3	37.0
	Major approach	2.6	5.2	5.0	7.6	10.6	15.7	2.8	4.8	3.5	7.0	8.7	11.0
An approach that uses a modified alphabet system which either augments or marks the regular alphabet so that it corresponds more closely to the sounds of the language.	Not used	87.9	84.5	87.4	85.0	86.3	88.2	83.7	85.3	86.9	84.6	81.6	87.6
	Secondary approach	6.9	9.5	8.0	10.3	9.7	10.1	7.9	9.6	7.7	10.6	12.7	9.0
	Major approach	5.2	6.0	4.6	4.7	3.6	1.7	9.5	7.1	5.4	4.8	5.7	3.5
An approach in which children read their own writings. These "stories" provide the material on which reading instruction is based.	Not used	63.5	68.6	64.4	69.7	64.3	67.4	63.5	67.0	64.0	65.8	63.0	65.6
	Secondary approach	33.0	27.1	30.8	26.6	30.9	29.5	31.3	26.9	29.7	28.2	33.4	30.1
	Major approach	3.5	4.3	4.8	3.7	4.7	3.1	5.2	6.1	6.3	6.0	3.6	4.3
An approach that includes reading in the content fields, such as science and social studies; teaching of study skills, such as how to use tables of contents, indices, graphs, dictionaires, encyclopedias, etc., and how to organize materials into outlines, summaries, and reports.	Not used	83.8	53.8	30.4	19.5	17.8	20.5	89.3	68.3	52.6	36.9	28.0	31.5
	Secondary approach	14.3	39.6	55.0	54.2	53.5	46.9	9.7	27.6	41.8	50.6	55.1	48.6
	Major approach	1.9	6.7	14.6	26.4	28.7	32.6	1.0	4.2	5.6	12.5	16.9	19.9
An approach that uses a reading series and/or other books to teach both literal comprehension and understanding of implied meanings in the text.	Not used	51.4	31.2	27.9	23.4	16.4	14.6	60.9	41.1	34.6	31.3	20.2	23.7
	Secondary approach	27.9	37.8	29.7	30.3	32.9	28.1	24.6	34.7	32.9	33.0	40.7	31.2
	Major approach	20.7	31.0	42.5	46.3	50.7	57.3	14.5	24.2	32.5	35.7	39.2	45.1
An approach that uses a reading series and/or library-type books to teach forms of literature and literary appreciation.	Not used	64.6	49.2	44.3	39.4	31.2	32.0	71.0	58.5	58.4	48.9	44.9	46.0
	Secondary approach	29.4	40.0	44.5	47.5	51.5	49.2	24.4	34.0	34.3	41.4	44.3	43.9
	Major approach	6.0	10.8	11.2	13.1	17.3	18.8	4.6	7.5	7.2	9.6	10.8	10.1

Table 6-14

Amount of Homework for Reading and Math Students and Reading-Related Activities for Reading Students

Item Content	Percentage of Teachers Responding (and Hours Per Week or Minutes Per Day)											
	Regular-Achieving Students						Low-Achieving Students					
	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
During an average week, how much (reading/math) homework do you assign to your regular and to your low-achieving (reading/math) students?												
Reading												
No homework	50.1	50.0	53.5	44.7	37.4	36.4	49.2	49.4	49.4	50.0	40.4	44.7
About a half an hour	24.1	19.9	20.1	18.0	18.4	16.0	28.5	23.5	23.7	18.8	21.4	21.6
About an hour	12.2	14.0	10.0	14.1	19.3	19.0	11.9	11.7	12.6	13.0	17.2	15.6
Between 1 and 2 hours	7.9	10.7	8.3	14.1	12.3	17.6	6.7	8.7	7.7	12.8	12.8	11.0
Between 2 and 3 hours	4.0	3.9	7.2	7.2	8.9	8.1	1.9	5.5	5.2	3.9	5.6	5.5
Between 3 and 4 hours	0.9	0.9	0.9	1.2	1.4	2.0	1.0	0.8	1.2	1.0	0.9	1.4
More than 4 hours	0.8	0.7	0.0	0.7	2.2	0.8	0.8	0.4	0.2	0.5	1.8	0.3
Mean hours per week	(0.53)	(0.56)	(0.54)	(0.70)	(0.84)	(0.84)	(0.48)	(0.55)	(0.54)	(0.57)	(0.72)	(0.63)
Math												
No homework	66.3	55.3	35.0	25.8	16.0	12.9	63.8	50.8	34.4	29.0	21.9	19.0
About a half an hour	20.5	23.7	28.7	26.0	21.0	22.9	22.9	24.7	31.7	26.1	25.5	27.5
About an hour	8.7	11.1	15.2	17.4	21.6	17.4	7.9	11.9	14.6	18.5	20.6	16.6
About 1 and 2 hours	2.8	6.2	11.5	18.2	21.3	25.9	3.9	6.4	11.1	15.3	18.1	23.3
Between 2 and 3 hours	1.4	2.5	7.8	10.2	14.0	15.0	1.2	4.2	6.1	9.1	9.7	9.1
Between 3 and 4 hours	0.2	0.7	1.7	1.8	4.4	3.8	0.2	1.4	2.1	0.5	2.6	4.2
More than 4 hours	0.2	0.5	0.0	0.5	1.7	2.1	0.0	0.6	0.0	1.3	1.6	0.3
Mean hours per week	(0.28)	(0.43)	(0.72)	(0.92)	(1.22)	(1.28)	(0.29)	(0.52)	(0.70)	(0.85)	(1.01)	(1.04)
In addition to your reading instruction period, how many minutes per day do your regular and low-achieving students spend in such reading-related activities as spelling, vocabulary study, grammar, writing, etc.?												
Mean minutes per day	(38.7)	(47.4)	(53.2)	(52.5)	(51.5)	(50.6)	(37.3)	(45.7)	(49.9)	(50.7)	(50.0)	(49.1)
S.D. minutes per day	(17.6)	(17.5)	(16.5)	(15.6)	(16.8)	(17.4)	(17.6)	(18.7)	(18.6)	(17.7)	(17.8)	(17.7)

Table 6-15

Assistance by Special Personnel for Reading and Math Instruction

Item Content	Mean Hours of Assistance Reported											
	Reading						Math					
	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
Approximately how many hours per week do the following kinds of additional personnel assist you with activities that are associated with teaching (reading/math)?												
Special (reading/math) teacher												
Regular-achieving students*	.11	.11	.07	.04	.09	.09	.03	.08	.03	.04	.11	.04
Low-achieving students	.79	1.28	1.16	1.32	1.10	1.01	.28	.39	.45	.59	.63	.53
Teaching aide or assistant (paid)												
Regular-achieving students	.49	.48	.33	.30	.20	.20	.35	.35	.29	.33	.17	.29
Low-achieving students	.82	.69	.76	.62	.56	.52	.58	.54	.57	.55	.52	.53
Volunteer (parent or other adult)												
Regular-achieving students	.30	.16	.13	.10	.07	.03	.11	.07	.08	.07	.05	.16
Low-achieving students	.18	.10	.13	.11	.06	.03	.08	.06	.03	.07	.03	.03
Student teacher (practice teaching)												
Regular-achieving students	.13	.14	.09	.13	.09	.07	.13	.11	.14	.10	.09	.10
Low-achieving students	.04	.01	.03	.05	.04	.02	.06	.01	.02	.08	.04	.03
Student tutor												
Regular-achieving students	.15	.07	.05	.06	.07	.04	.13	.05	.07	.07	.10	.05
Low-achieving students	.18	.14	.09	.13	.07	.09	.10	.08	.08	.11	.18	.18
Approximately how many hours per month do the following kinds of additional personnel assist you with activities that are associated with teaching (reading/math)?												
Counselor, psychologist												
Regular-achieving students*	.07	.08	.10	.03	.10	.05	.01	.01	.01	.02	.01	.04
Low-achieving students	.16	.12	.10	.21	.11	.13	.04	.03	.04	.06	.07	.04
Media specialist												
Regular-achieving students	.17	.25	.22	.24	.28	.27	.03	.03	.02	.09	.02	.04
Low-achieving students	.03	.12	.05	.14	.07	.06	.02	.05	.02	.06	.03	.04

Table 6-15 (Continued)

Speech therapist							
Regular-achieving students	.73	.59	.51	.38	.33	.22	Not Applicable
Low-achieving students	.47	.36	.32	.38	.17	.22	Not Applicable

*These items did not specifically ask for hours for regular-achieving students, but asked whether or not the assistance was primarily for low-achieving students. When teachers answered negatively, the hour responses were interpreted as being appropriate for regular-achieving students. When they answered positively, the responses were interpreted as being appropriate only for low-achieving students. This interpretation probably introduces an unknown amount of distortion into the means of this table.

Table 6-16

Use of Equipment by Staff and by Students for Teaching Reading and Math

Item Content	Mean Number of Times Per Month Equipment is Used											
	Reading						Math					
	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
How many times per month do you, a teaching assistant, an aide use the following kinds of equipment as part of (reading/math) instruction when teaching (reading/math) to (regular/low-achieving) (reading/math) students?												
Sound equipment												
Regular-achieving students	5.4	4.0	3.4	3.0	2.6	2.5	0.8	0.9	1.3	1.2	0.9	1.0
Low-achieving students	5.5	4.5	4.0	3.7	3.1	3.3	1.1	1.2	1.6	1.7	1.2	1.3
Projectors												
Regular-achieving students	2.9	2.6	2.3	2.2	2.1	2.0	0.8	1.0	1.1	1.3	1.3	1.5
Low-achieving students	2.9	2.7	2.3	2.3	2.2	2.2	0.9	1.0	1.2	1.4	1.1	1.5
Sound Projectors												
Regular-achieving students	2.1	1.8	2.0	1.6	1.4	1.3	0.3	0.5	0.5	0.5	0.5	0.7
Low-achieving students	2.2	2.1	2.1	1.9	1.7	1.8	0.5	0.6	0.6	0.7	0.6	0.8
Special teaching machines												
Regular-achieving students	0.8	0.8	0.6	0.6	0.3	0.5	0.2	0.3	0.2	0.4	0.4	0.5
Low-achieving students	1.2	1.4	1.1	1.3	1.1	1.4	0.4	0.3	0.5	0.6	0.6	0.6
Television												
Regular-achieving students	2.0	2.0	1.4	1.2	1.0	0.7	0.4	0.5	0.3	0.5	0.4	0.6
Low-achieving students	1.9	1.8	1.4	1.1	1.1	0.8	0.4	0.5	0.3	0.5	0.4	0.6

Table 6-16 (Continued)

How many times per month do your (regular/low-achieving) students independently use each of the following kinds of equipment as part of (reading/math) instruction?												
Sound equipment												
Regular-achieving students	6.1	4.8	3.9	3.3	2.7	2.2	0.9	0.8	2.0	1.5	1.1	0.8
Low-achieving students	6.2	5.3	4.7	4.2	3.5	3.3	1.3	1.0	2.0	2.4	1.6	1.5
Individual viewers												
Regular-achieving students	1.7	1.8	2.0	1.7	1.3	0.9	0.6	0.4	0.7	0.8	0.5	0.3
Low-achieving students	1.6	2.2	1.8	2.0	1.5	1.5	0.6	0.5	0.7	0.9	0.5	0.6
Sound projectors												
Regular-achieving students	1.4	1.6	1.8	1.8	1.1	1.0	0.3	0.4	0.5	0.6	0.5	0.4
Low-achieving students	1.6	1.8	1.9	1.9	1.5	1.4	0.6	0.4	0.6	0.9	0.7	0.7
Feedback teaching machines												
Regular-achieving students	0.4	0.1	0.3	0.3	0.2	0.1	0.2	0.3	0.1	0.4	0.2	0.2
Low-achieving students	0.3	0.3	0.5	0.4	0.4	0.3	0.2	0.4	0.4	0.7	0.4	0.5
Study carrels												
Regular-achieving students	1.0	1.1	1.5	1.6	1.1	0.9	0.5	0.8	0.9	1.3	0.9	0.9
Low-achieving students	1.0	1.7	1.5	2.0	1.4	1.6	0.7	1.3	1.2	1.7	0.9	1.5
Special teaching machines												
Regular-achieving students	1.3	1.0	0.7	0.6	0.3	0.4	0.4	0.5	0.3	0.8	0.8	0.8
Low-achieving students	1.5	1.9	1.6	1.7	1.2	1.0	0.6	0.6	0.5	1.2	1.0	1.0

Table 6-17

Use of Materials for Reading and Math Instruction

Item Content	Mean Number of Times Per Month Materials Are Used											
	Reading						Math					
	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 6
Approximately how many times per month do your (regular/low-achieving) (reading/math) students use the following materials in (reading/math) instruction? Textbooks												
Regular-achieving students	18.6	18.6	18.6	17.4	17.1	15.9	14.1	15.1	16.7	17.0	17.8	16.8
Low-achieving students	17.2	17.4	17.3	15.7	15.5	14.2	12.5	13.3	14.3	15.0	15.7	14.1
Supplementary readers												
Regular-achieving students	8.6	7.3	6.4	5.7	6.1	5.4	Not Applicable					
Low-achieving students	7.6	7.6	6.6	6.2	6.9	5.9	Not Applicable					
'Free reading' books												
Regular-achieving students	12.9	13.5	12.0	11.1	11.0	9.2	Not Applicable					
Low-achieving students	10.2	11.8	10.4	9.4	9.9	7.8	Not Applicable					
Programmed math texts												
Regular-achieving students	Not Applicable						3.1	4.7	4.3	3.2	3.3	3.0
Low-achieving students	Not Applicable						3.1	4.2	4.5	3.5	3.8	3.9
Reference books												
Regular-achieving students	1.7	3.3	4.6	5.9	6.7	7.4	0.5	0.7	1.0	1.5	1.6	1.3
Low-achieving students	1.3	2.7	3.2	4.6	5.4	6.0	0.9	0.9	1.5	1.9	1.5	1.4
Workbooks, dittos												
Regular-achieving students	18.5	17.5	16.9	14.3	13.3	11.6	17.1	13.7	12.6	10.7	9.5	9.6
Low-achieving students	17.2	16.2	15.5	13.4	12.8	11.2	16.5	15.4	12.6	12.1	11.2	10.8
Games, puzzles												
Regular-achieving students	12.5	10.1	7.1	5.8	3.8	3.3	9.5	8.4	6.5	5.4	4.2	3.0
Low-achieving students	12.5	10.6	7.6	6.6	4.9	4.4	10.4	8.0	7.2	6.6	5.6	4.4
Publishers kits or sets including programmed texts												
Regular-achieving students	5.0	4.8	4.0	4.6	4.4	3.3	Not Applicable					
Low-achieving students	5.1	5.1	4.2	5.5	5.0	5.0	Not Applicable					
Geoboards, Cuisenaire rods												
Regular-achieving students	Not Applicable						2.9	1.6	1.0	1.0	0.7	0.5
Low-achieving students	Not Applicable						3.1	2.1	1.7	1.8	1.2	0.6

Table 6-18

Statistics for Six Reading and Math Composite Variables Created from the Teacher Questionnaires

Descriptive Statistics	Individualized Instructional Approach in Reading	Individualized Instructional Approach in Math	Frequency per Month of Audio-Visual Exposure in Reading for Regular-Achieving Students	Frequency per Month of Audio-Visual Exposure in Reading for Low-Achieving Students	Frequency per Month of Audio-Visual Exposure in Math for Regular-Achieving Students	Frequency per Month of Audio-Visual Exposure in Math for Low-Achieving Students
Mean	19.98	15.97	17.86	21.33	7.25	9.44
S.D.	3.62	3.34	22.77	25.94	14.48	18.32
N	3,087	2,800	2,675	2,639	2,501	2,256
Number of items in composite	13	11	11	11	11	11
N for computing correlations and reliabilities	528	484	587	588	550	500
Internal-consistency reliability	.42	.59	.76	.77	.74	.75
Items* and item composite correlations	TQB06 .31 TQB12 −.02 TQB13 .09 TQB14 .25 TQB16A .27 TQB16B .44 TQB16C .35 TQB16D .23 TQB16E .39 TQB16F .40 TQB17A .34 TQB17B .35 TQB20U .76	TQC11 .05 TQC12 .31 TQC13 .63 TQC15A .28 TQC15B .47 TQC15C .40 TQC15D .32 TQC15E .50 TQC15F .48 TQC16A .56 TQC16B .47	TQB25A .68 TQB25B .60 TQB25C .61 TQB25D .51 TQB25E .30 TQB27A .77 TQB27B .60 TQB27C .69 TQB27D .29 TQB27E .48 TQB27F .48	TQB26A .67 TQB26B .56 TQB26C .50 TQB26D .51 TQB26E .25 TQB28A .77 TQB28B .72 TQB28C .66 TQB28D .43 TQB28E .44 TQB28F .52	TQC22A .70 TQC22B .54 TQC22C .64 TQC22D .61 TQC22E .31 TQC24A .69 TQC24B .58 TQC24C .66 TQC24D .45 TQC24E .50 TQC25F .35	TQC23A .70 TQC23B .59 TQC23C .58 TQC23D .62 TQC23E .30 TQC25A .70 TQC25B .64 TQC25C .66 TQC25D .38 TQC25E .48 TQC25F .44

*Items are documented in "A Compilation of Instruments Used in this Sustaining Effects Study", The SES Project Staff, 1979; item weights are provided in the text of this chapter.

PART III. MEASURES OF PRINCIPALS AND SCHOOLS

CHAPTER 7. MEASURES OF BACKGROUND, SCHOOL ACTIVITIES, AND ATTITUDES

Because the principal's role is usually one of managerial and instructional leadership, the principal, even though somewhat removed from the personal instructional process, was expected to have some influence on the effectiveness of educational programs. With this expectation, two Principal Questionnaires were developed to obtain information about the principals and about their schools. Part A (PQA) of the questionnaire focuses on the principal and general information about the school. Part B (PQB) provides more detailed information about the school and its instructional programs.

Because schools were used as sampling units, schools (and therefore principals) can be weighted to obtain national projections. Thus, the data presented from the Principal Questionnaires are projected to the national population.

PRINCIPAL QUESTIONNAIRE, PART A

The first three items of Table 7-1 describe the education and experience of principals. Over 90 percent of the principals have some education beyond the bachelor's degree. In addition, they have had an average of about 10 years of full-time teaching experience and over 8 years of experience as principals or assistant principals.

Table 7-1

Principals' Education and Experience (Projected to the National Population)

Item Content	Response Percentages or Means	
What is the highest earned college degree you hold? (Do not include honorary degrees).		
No degree or degree or diploma based on less than four year's work		0.0
Bachelor's degree		3.2
Master's degree, bachelor's degree plus fifth year preparation, or six-year specialist degree		92.4
Doctor's degree		4.4
How many years of full-time teaching experience have you had? (Do not include time as an administrator)	Mean	10.23
	S.D.	5.73
At the end of this school year, how many years will you have been a principal and/or assistant principal?		
In this school	Mean	6.23
	S.D.	4.26
In this school plus other schools	Mean	8.59
	SD.	4.50

Table 7-2

Principal's Participation in School Educational Programs (Projected to the National Population)

Item Content	Number of Hours Per Year	
	Mean	S.D.
How many hours have you spent during this school year participating in activities ted to curriculum development in your school in the areas listed below?		
Reading	11.68	7.29
Math	9.00	7.49
In this past school year, how many hours have you devoted to needs assessment, program planning, and program evaluation in your school for your math and reading activities?		
Reading	12.17	7.72
Math	10.07	7.69

Table 7-2 presents the next two items which describe the amount of time that principals devote to curriculum development in reading and math, to needs assessment, and to program planning and evaluation in reading and math. As can be seen, more time is spent on these activities for reading than for math.

Item 6, in Table 7-3, asked the principals to indicate how much staff-development training they had received within the last three years. The most common area of training was in leadership techniques, although they received training in other areas as well.

Table 7-3

Amount of Staff Development Training Received by Principals (Projected to the National Population)

Item Content	Number of Hours		Percentage of Principals Whose Training Was More Than 3 Years Ago
	Mean	S.D.	
For the following areas, indicate how many hours of staff development training (sponsored by the school district, region, or state) you have received within the last three years. Include only formal courses or workshops.			
Curriculum and instruction for low-achieving students	4.58	3.87	10.4
Leadership techniques	5.92	4.38	12.1
School-community relations	3.66	3.91	10.6
Needs assessment procedures	4.49	3.91	7.4
Program planning procedures	4.67	4.05	12.1
Program monitoring and evaluation procedures	4.73	4.08	10.0

Table 7-4

Principals' Meetings with Students for Disciplinary Purposes (Projected to the National Population)

Item Content	Number of Students Per Week	
	Mean	S.D.
On the average, how many students are seen by the administrative staff, including yourself, during a week for disciplinary purposes?		
Physical fights with teachers	.40	2.21
Vandalism or theft on school property	.95	1.47
Truancy or chronic tardiness	2.54	3.55
Talking back	2.60	2.50
Physical fights with students	3.17	3.27
Disruption in classroom or other school areas	3.74	3.93
Loss of materials (pencils, texts, etc.)	2.20	2.72

Table 7-4 presents data from Item 7, in which principals were asked to identify how many students they see each week for disciplinary purposes. National indicators of the state of school discipline would depend, of course, upon the seriousness of the behaviors giving rise to the disciplinary meetings. In any event, the average principal of a school with grades in the 1-6 range sees more than 3 students a day for disciplinary purposes.

Table 7-5

National Projections of Frequency of Methods Schools Use to Solicit Parent Participation in Curricular Decisions

Item Content	Percentage of Principals
Mark all the methods that your school used last year for soliciting parental input into decisions concerning your school's curriculum, i.e., subject content, sequence of objectives, and materials.	
A formal survey of parental opinion was used	25.9
Parents served on a steering or advisory committee which had a formally recognized vote on curriculum decisions	37.8
Parents were consulted informally	73.7
Parental volunteers, aides or teaching assistants had a formally recognized vote on curriculum decisions	18.9
I held individual conferences with concerned parents	69.6
Parents were consulted during open house	60.5

Item 8, in Table 7-5, describes methods that the principals use to solicit parental input into decisions about the curriculum. The most common methods are (1) informal consulting, (2) individual conferences with concerned parents, and (3) consulting with parents during open house. Formal methods are used relatively rarely.

The ways that decisions are made in the school were assessed by Item 9, reported in Table 7-6. The focus is on how much decision-making power administrators have as compared to teachers. In all areas except the assignment of teachers to classes, the majority of principals said that "administrators and teachers jointly decide." For assignment of teachers to classes, the most common response was "administrators decide after informal suggestions from teachers." The responses closely parallel those obtained from the same item on the Teacher Questionnaire.

Table 7-6

Ways Curricular Decisions Are Made
(Projected to the National Population)

Item Content	Percentage of Principals Responding				
	Administrators Decide With No Input from Teachers	Administrators Decide After Informal Suggestions from Teachers	Administrators Decide After Systematically Getting Input from Teachers	Administrators and Teachers Jointly Decide	Teachers Decide With No Input From Administrators
Below are listed a number of areas of interest to schools, and ways in which decisions are made. For each area, indicate the one way that decisions concerning that area actually are made in your school.					
Assignment of students to classes	5.9	18.3	35.3	39.4	1.1
Development of student grading procedures	2.9	9.2	32.7	53.2	2.0
Assignment of teachers to classes	25.1	33.2	24.6	16.2	0.8
Selection of basic instructional materials	0.5	5.0	19.3	72.2	3.0
Planning of course content	0.4	2.2	17.6	70.5	9.4
Promotion of school/community interaction	1.2	25.5	25.5	46.8	1.1

Table 7-7

Importance of Teacher Participation in Decision-Making (Projected to the National Population)

Item Content	Ratings of Principals	
	Mean	S.D.
How important is teacher participation in:		
Assignment of students to classes, development of student grading procedures, assignment of teachers to classes, selection of basic instructional materials, planning of course content, promotion of school/community interaction	8.93	1.92
(0 = unimportant; 12 = very important)		

The next item, presented in Table 7-7, asked principals to express how important they feel teacher input is to the decision-making in the same areas. Generally, principals feel that teacher input is quite important (9 out of a possible 12 points on the scale).

Table 7-8

Principals' Feelings Toward Aspects of Their School's Programs (Projected to the National Population)

Item Content	Percentage of Principals Responding				
	Strongly Agree	Agree	Neutral*	Disagree	Strongly Disagree
For each of the statements below concerning this school, indicate your general feelings.					
The school's programs are well-planned and clear	28.5	62.8	1.4	7.4	0.0
The school's programs are successful in meeting students' needs	15.3	74.3	1.4	9.1	0.0
I provide active leadership to the school's reading and math programs	19.4	69.6	1.4	8.6	1.1
Teachers in this school conduct effective instruction	45.5	51.6	1.4	1.6	0.0
Teachers in this school work well together	52.2	39.7	1.4	5.6	1.1
This school is a satisfying place in which to work	52.4	43.1	1.4	2.8	0.3
Staff development training provided to teachers is adequate	6.6	58.4	1.4	27.7	6.0
Teachers have sufficient resources to carry out effective instruction	28.3	59.7	1.4	9.7	0.9
Administrators keep teachers well informed	33.1	61.8	1.4	2.6	1.1
Conflicts among individuals are identified and faced, and not allowed to fester	37.6	54.4	1.4	5.6	1.1
Summary Score:					
Sum of all ten responses, ranging from 0 (strongly disagree), to 40 (strongly agree)			Mean	31.09	
			S.D.	5.25	

*A neutral alternative was not provided to the principals; its value was assigned to missing responses.

Table 7-9

Principals' Philosophies of Student Learning (Projected to the National Population)

Item Content	Percentage of Principals Checking Each Item
Which of these statements comes closest to expressing your philosophy?	
Most children learn best when lessons are specific, presented to the child in small steps, and with a well-planned sequence worked out in advance. With this in mind, teachers should carefully structure the lessons and experiences of their students.	67.9
Most children learn best by discovering things for themselves. Too much structure hinders their natural desire to discover, learn, and explore. Teachers should help students, not give them predigested materials.	32.1

Item 11, in Table 7-8, presents a list of statements about the school with which principals were asked to agree or disagree. The responses indicate that the attitudes are generally positive, with the least positive attitudes being expressed for "Staff development training provided to teachers is adequate."

In Table 7-9 the item describes two different philosophies of education and principals were asked to indicate which philosophy was closest to their own. Two-thirds of them favored a carefully structured approach to teaching, while only one-third favored a less structured "self-discovery" approach.

Item 13 asked how frequently the principal (or assistant) observes instruction for regular students and low-achieving students in the classroom. From Table 7-10, about 44 percent said

Table 7-10

Frequency of Principals' Classroom Visitations (Projected to the National Population)

Item Content'	Percentage of Principals Responding	
	Regular-Achieving	Low-Achieving
About how frequently do you or your assistant observe classroom instruction for regular and low-achieving students for a period of 10 minutes or more?		
Do not observe or do not have this type of student	5.3	7.4
Once a semester	20.4	19.4
Once a month	30.0	28.8
Once a week	17.5	16.9
More than once a week	17.1	19.9
Daily	9.1	7.7

Table 7-11

Contact Among Racial/Ethnic Groups of Students and of Teachers (Projected to the National Population)

Item Content	Percentage of Principals Checking Each Item and Percentage Responding
How would you describe the contacts among different racial/ethnic groups of pupils in your school?	
Groups stay separate	0.0
Formal relationships, but no intergroup friendships	1.4
A few intergroup friendships	12.3
Many intergroup friendships	32.7
Not applicable, because all or most students are of the same group	53.6
What are the relations among teachers of different racial or ethnic groups in your teacher lounge and cafeteria?	
Each race or ethnic group tends to separate	0.0
There is a small amount of mixing among racial or ethnic groups, or not applicable because all or most teachers are of the same group	57.0
Teachers mix freely	43.0

that they observed once a week or more often, for both regular and low-achieving students, while the remainder said that they observed less frequently than once a week.

Table 7-11 provides the principals' evaluation of the degree of intergroup contacts among students. More than half of the principals said that the item was not applicable because most of the students are of the same ethnic group. Of the rest of the principals, the large majority said that there were "many intergroup friendships" among their students. Item 18 provides the principals' evaluation of the amount of interaction among different racial/ethnic groups of teachers. As with the student item, this item was considered as not applicable by the majority of principals. Of the remainder, all said that the teachers mixed freely.

The next item, reported in Table 7-12, asked principals to identify what things they thought were effective in raising the achievement level of low-achieving students. Principals viewed the most effective things as having small classes, increasing the number of remedial support personnel, and retraining teachers to teach low-achieving students. Among those rated least effective are preschool efforts and parental involvement.

Items 16 and 17 asked principals to rate how their schools compared with other schools in terms of vandalism and violence. The ratings are presented in Table 7-13. The majority of principals think that their schools have less vandalism and violence than other schools (although accuracy of perception, the relative nature of the question, and the accuracy of the national projections all lead to the expectation of a majority's marking the second alternative, 'average amount').

Table 7-12

Principals' Beliefs About Raising the Achievement of Low-Achieving Students (Projected to the National Population)

Item Content	Percentage of Principals Responding		
	Effective	Moderately Effective	Generally Ineffective
To what extent do you believe the following are effective in raising the achievement of low-achieving students?			
Retraining teachers to teach low-achieving students	52.1	40.5	7.4
Mixing students of different achievement levels in classes	35.7	48.7	15.7
Having small classes (10 or fewer students)	68.4	23.3	8.3
Increasing the number of remedial reading and math support personnel	55.6	38.2	6.2
Increasing numbers of counseling and psychotherapy personnel	27.6	51.9	20.5
Starting remedial education at the pre-school level	37.7	38.4	23.9
Extensive use of cross-age tutoring	22.4	60.9	16.7
Parent involvement in classroom activities	30.9	45.1	24.0

Table 7-13

Vandalism and Physical Violence in Elementary Schools (Projected to the National Population)

Item Content	Percentage of Principals Responding
Compared to other schools with which you are familiar, is there much vandalism in this school and on the school grounds?	
A great deal of vandalism	2.2
An average amount of vandalism	14.3
Less vandalism than in other schools	69.1
No vandalism at this school	14.4
Compared to other schools with which you are familiar, is there much physical violence in this school (e.g., fights among students, attacks on teachers, etc.)?	
More than other schools	1.3
About the same as in other schools	15.6
Less than in other schools	61.7
No violence in this school	21.5

Table 7-14

Employment Status and Income of Elementary-School Principals (Projected to the National Population)

Item Content	Principal Responses
What is your employment status in this school system?	
Full-time principal	79.0%
Part-time principal, part-time teacher or other school-system staff	18.5%
Part-time principal, part-time superintendent	2.5%
What is your expected contract salary from this school system this year? Do not include supplements for extra services.	Mean $19,389 S.D. $ 4,855
What is your expected supplementary income from this school system this year? Include pay for extra services, summer school, etc.	Mean $ 256.0 S.D. $ 521.8

Responses to the last three items in the PQA are presented in Table 7-14. They describe the principals' employment status and salaries. About 79 percent of the principals are full-time principals while the remainder also have other responsibilities. On the average, the principals earned a little over $19,000 per year in contract salary, with additional income of about $250 per year in supplementary income. An unweighted average income of $749 (S.D. = $667) was calculated for the 31.8 percent of the principals who reported non-zero supplementary income from the school system.

CHAPTER 8. MEASURES OF SCHOOL CHARACTERISTICS

Characteristics of the schools, in addition to being interesting background information, are also expected to play a role in explaining the effects of the educational programs studied. Such information was obtained from the teachers, through a Teacher Questionnaire, Part A (TQA) and from the Principal Questionnaire, Part B (PQB).

SCHOOL-LEVEL INFORMATION FROM THE TEACHER QUESTIONNAIRE

Some of the items from the Teacher Questionnaire are intended to describe the school, rather than the teacher or the classroom. These items are presented here. In order to present the information as descriptive of the school, the teachers' responses were aggregated to the school-level, either by calculating the mean for all teachers in a given school (for example, the mean rating on a 5-point "Agree-Disagree" rating scale), or by calculating the percentage of teachers in a school who gave a certain response (for example, on a "Yes" or "No" item, perhaps 67 percent of the teachers in one school said "Yes", while 33 percent said "No"). After the data were aggregated, projected mean scores were computed from all schools, using the school-level weights, to obtain nationally projected figures. The reader should keep in mind while looking at these data, that the figures are either (1) means (across all schools) of mean teacher-responses per-school, or (2) means (across all schools) of percentages of teachers per school giving a certain response.

Four items from the TQA deal with the decision-making procedures within the schools. Table 8-1 provides a measure of decision-making areas. This item was scored by counting the number of areas in which each group is included. Note that the district has the highest mean, and that community groups, parents, and students generally are not included in decision-

Table 8-1

Involvement of Groups in Decision-Making
(Projected to National Population)

Item Content	Mean of School Means	S.D. of School Means
Indicate in how many of the three areas listed each person or group is included in the decision-making process. The areas are: Determining the Content of Your Courses, Budgeting Resources for Your Class, and Selecting Texts and Materials Used in Class.		
You (Teacher)	1.74	0.48
Staff as a whole	1.01	0.48
Principal	1.37	0.53
District	1.80	0.62
Organized community groups (other than parents)	0.10	0.13
Parents	0.18	0.23
Students	0.24	0.23

Table 8-2

Ways in Which Decisions Are Made (Projected to the National Population)

	Percentage of Teachers Per School Responding									
	Administrators decided with No input from Teachers		Administrators Decide After Informal Suggestions from Teachers		Administrators Decide Systematically Getting Input from Teachers		Administrators and Teachers Jointly Decide		Teachers Decide with No Input from	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Assignment of students to classes	23.5	22.7	26.6	21.1	13.0	12.6	30.5	25.3	6.3	11.2
Development of student-grading procedures	12.2	15.1	15.0	12.0	18.8	17.7	41.2	22.6	12.9	15.2
Assignment of teachers to classes	46.4	24.5	23.9	15.3	12.7	13.4	15.8	17.9	1.2	4.2
Selection of basic instructional materials	5.3	8.5	13.8	13.7	26.1	19.0	47.2	24.0	7.5	13.1
Planning of course content	8.2	12.2	10.4	10.4	15.6	15.8	43.9	19.9	22.0	19.7
Promotion of school/community interaction	13.5	14.5	25.6	16.7	14.6	12.2	43.9	21.3	2.4	5.4

Table 8-3

Teachers' Ratings of the Importance of Their Participation in Decision Areas

	Percentage of Teachers Per School Responding									
	The Most Important		Among the More Important		Neutral*		Among the Less Important		The Least Important	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Assignment of students to classes	12.6	12.1	51.5	18.1	2.5	4.8	25.8	16.6	7.7	9.6
Development of student grading procedures	14.5	11.9	65.3	17.8	3.2	6.5	15.6	13.8	1.4	3.4
Assignment of teachers to classes	12.4	11.0	52.5	18.3	3.2	5.4	26.2	15.4	5.6	7.5
Selection of basic instructional materials	39.0	17.5	55.0	18.2	2.8	5.7	3.1	5.5	.1	.6
Planning of course content	40.9	17.8	54.0	17.4	2.4	5.3	2.5	4.2	.3	1.6
Promotion of school/community interaction	7.0	9.0	57.2	17.5	3.3	5.4	26.6	15.7	6.0	8.5

*A neutral alternative was not provided to the teachers, it was created for missing responses.

making. Note also that individual teachers (the group labeled 'You') view themselves as being included in decision-making more often than the 'Staff as a Whole'.

Item TQA16 in Table 8-2 asked the teachers to indicate the amount of input into decisions that teachers have relative to administrators, in a number of decision areas. In all of these areas except one, the largest percentage of teachers per school responded that "administrators and teachers jointly decide". The one exception was for "assignment of teachers to classes", where the majority of teachers per school responded that "administrators decide with no input from teachers".

A parallel item, TQA17, is presented in Table 8-3. It explored how *important* the teachers felt their participation in decision-making in these same areas was. The large majority of teachers per school responded that their participation is "among the more important" or "the most important", for all six decision making areas.

Item 18, presented in Table 8-4, asked teachers to rate how satisfied they were with the way most decisions are made. Over 90 percent (average per school) said that they were "very satisfied" or "somewhat satisfied".

The next three items focus on the principal's role in relation to the teachers. Summary statistics of teachers' responses are presented in Table 8-5. In item 19, the teachers described their principals as being typically "very supportive" of their work, while in item 20, they described the principals as having a distinct point of view about instruction, while still letting the teachers do as they think best. Finally, in item 21, the majority of teachers per school reported that the principal openly encourages innovation in teaching methods.

Items 22 and 23, presented in Table 8-6 provide descriptions of how the instructional programs are organized in the schools. On the average, over three-fourths of the teachers per school said that there is a coordinated schoolwide instructional program for reading and

Table 8-4

Teacher Satisfaction With Decision-Making Procedures (Projected to the National Population)

Item Content	Percentage of Teachers Per School	
	Mean	S.D.
How satisfied are you with the way most decisions are made in your school?		
Very satisfied	35.6	22.7
Somewhat satisfied	56.1	19.4
Not satisfied at all	8.3	12.9

Table 8-5

Principal's Role and Influence (Projected to the National Population)

Item Content	Percentage of Teachers Per School	
	Mean	S.D.
Which phrase best describes your principal's (or other members of the administrative staff) support of your work as a teacher?		
Very supportive	64.2	21.9
Somewhat supportive	23.1	15.5
Neutral	7.7	10.3
Somewhat unsupportive	3.8	7.8
Very unsupportive	1.2	3.6
Which of the following statements best characterizes your principal's role with respect to your school's instructional program?		
The principal has a distinct point of view, and actively promotes it	32.9	24.2
The principal has a point of view, but lets teachers do as they think best	67.1	24.2
Does the principal of your school encourage teachers to try out new teaching methods?		
Yes, the principal openly encourages innovation	54.7	25.2
Yes, but only under close supervision	8.5	10.9
No, the principal prefers proven methods	5.4	11.1
The principal neither encourages nor discourages innovation	31.3	22.1

math. In item 23, regular and compensatory programs are described as being either independent of each other, but well coordinated, or as being combined into a single coordinated program. However, a substantial minority of teachers per school indicated that the regular and compensatory programs are independent of each other.

Item 24, in Table 8-7 provides a number of attitudinal statements that teachers were asked to agree or disagree with (using a 0-4 rating scale). The three statements that received the highest ratings are: (1) Teachers in this school conduct effective instruction, (2) Teachers in this school work well together, and (3) This school is a satisfying place in which to work. The two statements rated lowest are: (1) The principal provides active leadership to reading and math programs, and (2) Staff development training provided to me is adequate.

Table 8-8 provides a brief summary of some of the student-grouping practices used in the schools. As can be seen from the table, mixing students of different ability levels in classes is quite common, while the use of ungraded classes is rare. Flexible scheduling, assignment of students based on ability, and mixing grades within classes are used in a substantial minority of cases.

Table 8-6

Schoolwide Program Coordination and the Relationship Between Regular and Compensatory Programs (Projected to the National Population)

Item Content	Percentage of Teachers Per School	
	Mean	S.D.
Is there a coordinated, schoolwide instructional program (content, sequence of objectives, materials) for reading and math?		
There is a coordinated program for reading	79.8	21.4
There is a coordinated program for math	75.4	22.5
Which of the following best describes the relationship between the regular instructional program and the compensatory instructional program(s) in your school?		
We have no compensatory program	16.5	26.5
All of our programs are compensatory	1.8	5.8
The regular and compensatory instructional programs are combined. Regular classroom teachers and compensatory teachers continually coordinate instructional activities with each other	27.6	24.2
The regular instructional program and the compensatory program(s) tend to be quite independent of each other	11.6	12.4
While the regular and compensatory programs are independent of each other, regular classroom teachers try to be aware of what is happening in the compensatory program(s)	32.3	19.8
While the regular and compensatory programs are independent of each other, compensatory teachers try to make up for the inadequacies of the regular instructional program	10.2	10.6

The next two items are presented in Table 8-9. They deal with intergroup relations among teachers (item 26) and students (item 27). In general, where mixing among ethnic groups is possible, teachers report that mixing does occur. Note, however, that mixing is not possible in most of the schools because students (and quite likely teachers also) belong to the same group. A group of four items in the TQB and TQC deals with the individuals who are involved in developing and/or evaluating the reading and math programs for regular and compensatory students. The responses are presented in Table 8-10. Those who are most involved are district personnel, principals, or other administrators, and teachers, while Parent Advisory Councils, parents and students have little involvement.

The last item in both the TQB and TQC asked teachers to indicate what activities were missed by compensatory students when they were participating in the compensatory program. As can be seen in Table 8-11, compensatory reading students most commonly miss other reading or language arts activities, while compensatory math students most commonly miss other math activities.

Table 8-7

Teachers' Attitudes Toward Their Schools (Projected to the National Population)

Item Content	Average School Rating	
	Mean	S.D.
For each of the statements below concerning this school, indicate your general feelings by rating 0 for 'strongly disagree', 1 for 'disagree', 2 for 'neutral'*, 3 for 'agree', or 4 for 'strongly agree'.		
The school's programs are well planned and clear	2.7	0.5
The school's programs are successful in meeting student's needs	2.6	0.5
The principal provides active leadership to reading and math programs	2.3	0.6
Teachers in this school conduct effective instruction	3.1	0.3
Teachers in this school work well together	3.1	0.5
This school is a satisfying place in which to work	3.1	0.5
Staff development training provided me is adequate	2.3	0.5
I have sufficient resources to carry out effective instruction	2.7	0.5
Administrators keep teachers well informed	2.5	0.6
Conflicts among individuals are identified and faced, and not allowed to fester	2.4	0.5
Summary Scores Developed:		
Teacher attitude (sum of 1st, 2nd, 4th, and 8th items)	11.2	1.5
Principal leadership (sum of 3rd and 9th items)	4.7	1.1
School climate (sum of 5th, 6th, and 10th items)	8.6	1.3

*A 'neutral' alternative was not provided to the teachers; its value was assigned to missing responses.

Table 8-8

Student Grouping Practices Used in Schools (Projected to the National Population)

Item Content	Percentage of Teachers Per School Marking Practices	
	Mean	S.D.
Indicate which of the following practices are used extensively in your school.		
Mixing students of different ability levels in classes	85.5	19.8
Assigning students to classes on the basis of ability	33.8	30.3
Use of ungraded classes	9.3	19.2
Flexible scheduling of classes	35.3	21.8
Mixing grades within classes	23.4	27.0

Table 8-9

Intergroup Relations of Teachers and Students (Projected to the National Population)

Item Content	Percentage of Teachers Per School	
	Mean	S.D.
What are the relations among teachers of different racial or ethnic groups in your teacher lounge and cafeteria?		
Teachers mix freely	44.5	34.5
There is a small amount of mixing among racial or ethnic groups, or, not applicable because all or most of the teachers are of the same group	54.3	34.5
Each race or ethnic group tends to stay separate	1.2	6.1
How would you describe the contacts among different racial/ethnic groups of pupils in your school?		
Many intergroup friendships	27.4	26.1
A few intergroup friendships	17.2	20.1
Formal relationships but no intergroup friendships	2.4	5.5
Groups stay separate	1.3	3.7
Not applicable because all or most students are of the same group	51.7	39.4

Table 8-10

Involvement of Staff in Reading and Math Program Planning, Development, and Evaluation (Projected to the National Population)

In how many areas are each of the listed personnel of your school actively involved in your school's (regular/compensatory) (reading/math) programs? The areas are: School Academic Needs Assessment, Planning and Developing Programs, and Monitoring and Evaluating Programs.

School's Personnel	Mean Number of Areas Checked by Teachers Per School							
	Reading Programs				Math Programs			
	Regular		Compensatory		Regular		Compensatory	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
District Personnel	1.7	0.7	1.4	0.8	1.6	0.7	0.9	0.8
Principal and/or other administrative staff	1.8	0.6	1.5	0.7	1.7	0.6	0.9	0.7
A teacher who specializes in teaching reading/math	1.1	0.7	1.4	0.8	0.6	0.5	0.6	0.7
Regular classroom teachers	1.8	0.5	0.8	0.6	1.8	0.6	0.6	0.6
Parent Advisory Council	0.2	0.3	0.3	0.4	0.2	0.3	0.1	0.3
Parents	0.1	0.2	0.1	0.3	0.1	0.2	0.1	0.2
Students	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2

Table 8-11

Activities Missed by Compensatory Reading and Math Students (Projected to the National Population)

Item Content	Percentage of Teachers Checking Each Item Per School	
	Mean	S.D.
When students are participating in compensatory reading activities in what types of activities are their non-participant peers involved?		
Other reading or language arts activities	71.7	24.8
Math activities	22.4	18.8
Activities related to other subject matter areas, i.e., science, social studies, health, etc.	34.1	22.2
Study time	26.4	21.9
Student-selected activities	21.8	19.7
Visits to the school library	13.3	17.0
Physical education activities	3.4	5.9
Field trips	1.6	3.6
When students are participating in compensatory mathematics activities in what types of activities are their non-participant peers involved?		
Other math activities	51.4	27.0
Reading or other language arts activities	19.7	21.5
Activities related to other subject matter areas, science, social studies, health, etc.	22.2	22.8
Study time	17.9	19.3
Student-selected activities	13.6	16.0
Visits to the school library	5.8	10.3
Physical education activities	2.8	9.6
Field trips	1.0	3.4

Table 8-12

Schools' Centralized Educational Facilities (Projected to the National Population)

Item Content	Percentage of Principals Responding
Indicate whether your school has a centralized school library, a school reading resource center, and/or a school mathematics resource center.	
No facilities, or missing responses	3.5
Has library only	34.5
Has reading resource center only	4.7
Has mathematics resource center only	0.0
Has library and reading center only	25.9
Has library and math center only	0.5
Has reading and math centers only	0.5
Has all three facilities	30.4

PRINCIPAL QUESTIONNAIRE, PART B

Part B of the Principal Questionnaire (PQB) provides more detailed information about the schools and their educational programs. As with Part A, all of the information presented here has been weighted and projected to the national population of schools with grades in the 1-6 range.

The first item, presented in Table 8-12, provides an indication of some of the educational facilities available in the schools. About 91 percent of the schools have a central library, and it is frequently accompanied by a reading center or by a reading center and a math center. Resource centers are rarely found in schools that don't have libraries.

Table 8-13

Lengths of School Days and School Years (Projected to the National Population)

Item Content	Mean	S.D.	Percentage of Schools
How many hours of instruction do students at each grade receive in a typical school day?			
Grade 1	5.40	0.73	
Grade 2	5.[illegible]	0.73	
Grade 3	5.50	0.70	
Grade 4	5.62	0.6[illegible]	
Grade 5	5.66	0.66	
Grade 6	5.74	0.65	
Does your school have half-day sessions this year for any of the grades listed below? ('yes' responses tabulated)			
Grade 1			3.6
Grade 2			3.6
Grade 3			3.9
Grade 4			3.5
Grade 5			3.9
Grade 6			4.7
For how many days is school in session during this year, (1976-1977)?			
Less than 160 days			1.9
160-165 days			4.4
166-170 days			5.8
171-175 days			14.1
176-180 days			62.4
181-185 days			10.5
186-190 days			0.8
191 days or more			0.0
Length of school year in days:	17[illegible].27	5.23	

Table 8-14

Incidence of Grade Retention (Projected to the National Population)

Item Content	Percentage of Responses in Each Response Category								Mean %
	0%	1-2%	3-5%	6-10%	11-15%	16-20%	21-25%	26+%	
Approximately what percentage of your students in each grade are repeating the grade they were in last year?									
Grade 1	28.3	40.5	16.8	7.4	3.4	2.4	1.3	0.0	3.0
Grade 2	42.7	41.4	12.5	1.8	1.3	0.3	0.0	0.0	1.5
Grade 3	53.4	38.2	5.5	2.2	0.3	0.5	0.0	0.0	1.1
Grade 4	63.3	28.3	6.2	0.8	1.3	0.0	0.0	0.0	0.9
Grade 5	68.3	25.6	3.4	0.9	0.6	0.0	0.0	1.3	1.0
Grade 6	70.4	25.1	2.3	0.8	0.0	0.0	0.0	1.4	0.9

Table 8-13 presents items 2 and 3, which describe how much instruction students receive. On the average, students receive about 5.5 hours of instruction per day, with the school day lengthening for higher grades. Very few schools have half day sessions, and most schools are in session about 180 days per year.

Item 4, asked the principals to indicate what percentage of their students (by grade) are repeating the same grade. The average percentages are presented in Table 8-14 and range from 3 percent in grade 1 to less than 1 percent in grades 4 and 6.

Table 8-15

Age Requirements for Entering First Grade (Projected to the National Population)

Item Content	Percentage of Principals Responding
Most schools require a student to be six years old, or almost six, when entering first grade. By which month of the year must a student be six years old to enter your first grade in the fall?	
We have no such requirement	2.6
We don't have a first grade	6.9
August	2.9
September	17.6
October	20.0
November	9.1
December	29.8
January	9.7
February	1.4
March	0.0
April	0.0

In item 5, Table 8-15, the principals indicate the age requirements for entry for first graders into their schools. In 40 percent of the schools, a student must be six years old by September or October in order to enter the first grade. If the end of January marks half the school year, in 96 percent of the schools with first grades, the student must reach six in the first half.

Teacher assignment practices are the subject of item 7, presented in Table 8-16. According to 43 percent of the principals, teacher assignment to a school is based on both personal choice and school needs, while 40 percent of the principals state that a teacher is hired to teach in a specific school. The remainder of the principals reported that teachers are assigned to a specific school without regard to personal choice. Item 33 describes how teachers are selected to teach in compensatory programs. In 47 percent of the schools, selection is based on the completion of specialized training.

The next two items deal with student placement practices. From Table 8-17, it can be seen that in about 88 percent of the schools mixing students of different achievement levels in classes is used extensively, and 83 percent of the principals reported that some kind of educational basis (tests, special needs, teacher judgment) is used to place students in classes.

Items 10 and 11, presented in Table 8-18, asked the principals to indicate what percentage of their students moved into or out of the school attendance area in a year. On the average, 8 percent of the students moved *from,* and 9 percent moved *to* the attendance area (but note

Table 8-16

Methods of Assigning Teachers to Schools and to Compensatory Programs (Projected to the National Population)

Item Content	Percentage of Principals Responding
Which of the following statements best describe the teacher assignment practice most often followed in this school system?	
A teacher is hired to teach in a specific school	39.8
A teacher is hired by the school system and given a choice where to teach	0.0
A teacher is hired by the school system and assigned to a school without regard to personal choice	17.2
Assignment is based on both personal choice and school needs	43.0
What is the most frequent basis for assignment or selection of personnel to teach in compensatory programs?	
Stated teacher preference	2.3
Specialized training	46.7
Previous teaching experience	5.5
Assignment of personnel by district	27.4
Specified by funding source	1.5
Same ethnic or linguistic background as students	0.4
No compensatory programs in this school	16.2

Table 8-17

Student Grouping and Placement Practices (Projected to the National Population)

Item Content	Percentage of Principals Responding
Indicate which of the following practices are used extensively in your school	
Mixing students of different achievement levels in classes	87.5
Assigning students to classes on the basis of achievement	36.2
Using ungraded classes	13.6
Flexible scheduling of classes	27.4
Mixing grades within classes	27.0
On what basis are pupils placed in the regular instructional program? Mark all placement procedures that apply.	
Educational Basis (performance on instructional objectives; Scores on Standardized tests of achievement or intelligence; Special needs such as psychological or emotional problems, handicap, or language impediments; Teacher judgment of pupil's needs)	82.5
Arbitrary Basis (Alphabetical; Classes kept more or less intact over the years; Random assignment)	17.4
Request Basis (Student request, Parent request)	0.2

Table 8-18

National Projections of Student Mobility

Item Content	Percentage of Principals Responding
What percent of the total student body moved from the school attendance area during this school year?	
0-5%	51.5
6-10%	28.8
11-25%	14.5
26-50%	4.4
51% or more	0.9
Mean percentage of students moved from area = 8.38; S.D. = 9.58	
What percent of the total student body moved into the school attendance area during this school year?	
0-5%	48.2
6-10%	29.9
11-25%	15.3
26-50%	5.5
51% or more	1.0
Mean percentage of students moved into area = 9.05; S.D. = 10.19	

Table 8-19

People Involved in Making Instructional Decisions (Projected to the National Population)

Item Content	Percentage of Principals Indicating Participation is Involved					
	Individual Teachers	School Staff as a Whole	District Principal	Staff	Parents	Students
Indicate the parties that are included in the decision-making for each of the listed areas.						
Course content	57.7	56.4	49.6	59.2	20.3	5.3
Budgeting of resources for classes	36.9	43.4	66.5	55.5	9.4	1.8
Hiring and firing of teachers	4.5	6.2	73.6	76.0	2.0	0.8
Texts and materials used in class	58.5	67.9	57.6	62.1	12.8	5.8

the large standard deviations for these figures). The percentage of students who are counted twice — because they are very mobile and move in and out in one year — was not determined.

Item 12 provides a measure of the amount of involvement of various groups of people in the school's decision-making process. As can be seen from Table 8-19, the principals and district staff are most involved, while parents and students have very little involvement.

The next 8 items, presented in Table 8-20, deal with the relationships between schools and parents. In item 13, 23 percent of the principals indicated that their schools had no PTA/PTO, and an additional 59 percent indicated that "only a few" or "less than half" of their students' families are present at a typical PTA/PTO meeting. Item 14 indicates that the schools typically use several methods to report student progress to parents, including report cards, parent-teacher conferences, written summaries of progress, and telephone contacts. Newsletters, use of parent volunteers, and home visits or calls are the most frequently used methods for the promotion of parental involvement. In addition, an average of about 16 percent of the paid clerical or technical staff positions in the schools are filled by parents of children who attend the same school. Item 17 indicates that, in about half the schools, if a parent wants to visit a classroom then he/she must go to the school office first and obtain approval — although in 18 percent of the schools parents may go directly to the classroom without first checking in at the office. Item 19 indicates that in three-fourths of the schools there are formal procedures for securing parent suggestions and/or complaints. In item 20, principals state that they meet with parent groups about 6 times per year. Item 18 indicates that the principal is the one who participates the most in such activities as orienting parents, assisting with PTA/PTO meetings and identifying where parent services are needed, although teachers, and to a lesser extent parents and other staff also perform these tasks.

Items 21 and 22, in Table 8-21 focus on busing practices. About 54 percent of the principals state that more than half of the students in their school are bused to school. Of those students who are bused, about 35 percent are bused because they live too far to walk to school, while about 1 percent are bused to promote racial/ethnic balance.

Table 8-20

Frequency and Types of Parent Meetings and Communications (Projected to the National Population)

Item Content	Percentage of Principals Responding
How many of your students' families are represented at a typical meeting of your Parent-Teacher Association or Organization?	
Almost all of them	4.6
Over half	5.8
About half	7.4
Less than half	26.9
Only a few	32.0
We have no PTA or PTO	23.2
How does your school officially report student progress to parents?	
Report cards only	5.2
Parent-teacher conferences only	0.2
Written summary of progress only	0.0
Telephone contacts only	0.0
Two of the above methods	26.5
Three of the above methods	37.1
All four of the above methods	31.0
What does your school do three or more times a year to promote parent involvement?	
Publish a newsletter	64.6
Provide evening time for parent conferences	37.9
Use school for adult education classes, community meetings	40.0
Provide means for parents to participate in planning and decision making	31.6
Hold faculty-parent social functions	34.9
Recruit and use parent volunteers	60.5
Staff members visit parents at home and/or telephone parents	67.9
None of the above	3.0
What percentage of your paid clerical or technical positions (para-professional) are filled by parents of children who attend this school?	
0%	29.9
1-10%	44.4
11-20%	6.2
21-30%	2.0
31-40%	0.6
41-50%	3.9
51-60%	2.4
61-70%	2.8
71-80%	1.9
81-90%	1.9
91-100%	4.0
What procedures must parents follow to visit a classroom?	
Parents may go directly to classroom without checking in at office	18.0
Parents go to office first and sign in; approval is automatic	27.1
Parents go to office first and obtain approval to visit the class	50.2
Parents must obtain approval a day or more in advance	4.7

Table 8-20 (Continued)

What procedures are used to secure parent suggestions or complaints?	
Meetings of parent advisory organization	48.3
Meetings of Parent-Teacher Association	56.7
Contact with the school's administrative staff	78.1
We have no established procedures	5.7
How many times per year do you meet with parent groups?	
Twice or more a month	13.2
About once a month	43.1
Two to four times a year	32.8
About once a year	6.1
Only for emergencies	4.8

Who participates in orienting parents to the school's programs, assists with parent organization meetings, and identifies areas where parent services are needed?

	Orienting Parents	Assisting Meetings	Identifying Services
The principal or other administrator	88.5	76.1	76.6
A school employee responsible for parent involvement	16.7	16.2	16.5
Classroom teachers	70.2	58.0	62.5
Parents	32.1	48.4	27.6
Other staff	33.4	33.3	36.8

Table 8-21

Student Busing Practices (Projected to the National Population)

Item Content	Percentage of Principals Responding*
What percent of your total student enrollment is bused to school?	
0%	11.7
1-25%	19.3
26-50%	15.6
51-75%	14.7
76-100%	38.8

Of those students who are bused to school, indicate the percentage bused for each reason below.

	0% Bused	1-10% Bused	11-20% Bused	21-50% Bused	50+% Bused
To transport students who live too far to walk to school	11.8	8.3	2.5	12.3	65.2
To transport handicapped students	73.0	22.5	1.5	0.5	2.5
To relieve overcrowding in another school	90.7	4.4	1.0	1.5	2.5
To promote racial/ethnic balance	85.8	5.4	2.9	1.0	4.9
To handle students whose schools have recently closed	97.5	1.0	0.5	0.5	0.5

*Because 38 of the schools in the sample have no busing, the response percentages for the second item have not been weighted, but are based on the responses of 204 principals.

Table 8-22

Meetings of Advisory Councils, Parent Groups, and Other Groups (Projected to the National Population

Item Content	Percentage of Principals Responding			
	1-2 Times a Semester	More Often Than Monthly	Not Monthly	Applicable
How often do the following groups meet?				
Federal and/or state mandated school advisory council	34.0	18.1	3.5	44.3
Non-mandated school advisory committees	12.0	14.4	2.1	71.6
Parent-Teacher Association	23.2	48.5	4.4	23.9
Voluntary school committee for planning and decision making	12.6	9.1	6.7	71.6
Faculty association/faculty senate	15.6	32.4	24.1	28.0

Table 8-22 presents data from item 23, which lists a number of groups, and asks the principals to indicate how many times per year each group meets. Advisory councils typically meet about 6-7 times per year, while PTA/PTO groups meet about 8 times, and the faculty association about 10 times.

The next four items are presented in Table 8-23. They describe the inservice training received by teachers and aides. Typically, a greater percentage of teachers and aides received training in reading than in math, and the number of hours of such training was higher for reading than for math.

Item 28 in Table 8-24 provides a general measure of the amount of staff development activities that occur. On the average, such activities occur about 17-18 times per year. The method of compensating teachers and aides for attending inservice training is described by item 29 in the lower half of Table 8-24. In over 70 percent of the schools, teachers are either released from their regular assignments or are paid to attend, whereas this is true for aides in only 49 percent of the schools. Forty percent of the schools have no inservice training for aides.

Table 8-25 presents data from three items on the CE programs of the schools. Item 30 asked the principals to indicate what types of compensatory funding their school was receiving. About 70 percent indicated that they received Title I funds, 34 percent received other federal funds, and 40 percent received state funds. About 14 percent said that they received no special funds for compensatory services. Item 31 describes how designated students receive compensatory services in reading and math. Over 80 percent of the principals indicated that students are "pulled out" of regular classes for special instruction, although other methods are also used. The reader should note that this does not necessarily mean that over 80 percent of the students receive their CE in pull-out situations; it means the pull-out does occur, to some

Table 8-23

Incidence and Extent of Inservice Training (Projected to the National Population)

Item Content	Mean	S.D.
About what percentage of your school's teachers and paid aides or paid teaching assistants received inservice training in activities associated with teaching reading during the last summer and this school year?		
Teachers	29.5%	33.0%
Paid aides	23.4%	36.2%
Paid teaching assistants	6.4%	21.5%
For the teachers and aides who received training in activities associated with teaching reading, about how many hours of training did the typical teacher or aide receive?		
Teachers	10.0 hrs.	12.6 hrs.
Paid aides	4.4 hrs.	8.6 hrs.
Paid teaching assistants	2.9 hrs.	12.8 hrs.
About what percentage of your school's teachers and paid aides or paid teaching assistants received inservice training in activities associated with teaching mathematics during last summer and this school year?		
Teachers	16.1%	24.0%
Paid aides	1.7%	1.5%
Paid teaching assistants	1.8%	8.8%
For the teachers and aides who received training in activities associated with teaching mathematics, about how many hours of training did the typical teacher or aide receive?		
Teachers	7.7 hrs.	11.5 hrs.
Paid aides	3.0 hrs.	7.0 hrs.
Paid teaching assistants	.7 hrs.	2.6 hrs.

extent, in over 80 percent of the schools. Item 32 describes how students are selected to receive compensatory services. The two most common selection criteria are depressed reading or math test scores and teacher recommendations.

Item 34, which describes in detail the number and types of school staff, has not been included in this report because it provides no useful information for the reader (the responses are largely determined by the sizes of the schools). However, item 35 (Table 8-26) has been included, since it describes the ethnic composition of the staffs.

A number of composites were developed using items from the Principal Questionnaire, often in combination with items from other questionnaires. For each of these composites, the projected mean and standard deviation have been calculated. In addition, unweighted item-total correlations and unweighted alpha reliability coefficients have been calculated where

Table 8-24

Frequency of Staff Development Activities and Methods of Compensating Staff for Inservice Training
(Projected to the National Population)

Item Content	Percentage of Principals Responding				
	Never	Once or Twice a Year	Several Times a Year	About Once a Month	More Often
Indicate the frequency with which the following staff development activities occur.					
Group discussions	3.1	6.7	35.2	25.4	29.6
Staff inservice workshops	6.3	45.1	35.6	11.6	1.4
Seminars, lectures, guest speakers, etc.	20.6	60.7	15.7	2.6	0.5
Field trips	55.4	24.4	16.5	1.3	2.4
Sensitivity training sessions	80.2	16.0	3.0	0.5	0.3
What is the usual method in your school for compensating teachers and aides for attending inservice training?					
Teachers					
Staff are released from regular assignment or attend on own time and are paid to attend			71.2		
Staff attend on own time and are not paid for attendance			24.8		
Have no inservice training programs			4.0		
Aides					
Staff are released from regular assignment or attend on own time and are paid to attend			49.0		
Staff attend on own time and are not paid for attendance			11.2		
Have no inservice training program			39.8		

appropriate. (Note, however, that the strength of the item-total correlations depends in part on the relative sizes of the ranges for the items.) The composites are described below and data are provided in Table 8-27.

Staff/Student Ratio. This is simply the total number of school staff divided by the total number of students in the school. The mean ratio, presented in Table 8-27, is .07, indicating approximately 1 staff member for every 14 students.

Ratio of Support Personnel to Teaching Personnel. For this composite, the number of support personnel in the school was divided by the number of teaching personnel. The mean ratio is .15, indicating that, on the average, there is about one support person for every 6.5 teachers.

Student Mobility Rate. This composite sums two items from the PQB (percentage of students moving from the school attendance area, and percentage moving into the school attendance area), to obtain a measure of student mobility. On the average, about 17 percent of a school's students move into and/or out of the school's attendance area in a year's time.

Table 8-25

Compensatory Funding Received by Schools, Methods for Delivering Compensatory Services, and Student Selection Procedures (Projected to the National Population)

Item Content	Percentage of Principals Responding
What type of funding is your school receiving this year for compensatory education services?	
ESEA Title I	69.8
Other Federal funds for compensatory services	33.6
State funds for compensatory services	40.0
District funds for compensatory services	28.1
No special funds for compensatory services	14.3
How do students designated to receive compensatory services receive instructions in reading and mathematics?	
No compensatory-designated students in this school	13.4
As part of an entire class that receives the same instruction	17.3
They are "pulled out" of regular classes for special instruction	81.1
Aides work with these students within the regular classroom	35.0
Compensatory or special teachers work with these students within the regular classroom	19.5
The regular classroom teachers work with these students, while aides work with the other students within the regular classroom	17.6
What is the basis for determining pupil participation in compensatory programs?	
All students in the school participate	1.1
Membership in one or more specific target groups	21.5
Depressed reading or math test results	81.6
Teacher (or other staff) recommendation	67.3
Parent request	32.2
Volunteer	2.3
No compensatory programs in this school	13.6

Busing to Promote Racial Balance. This is not a true composite, but simply a reproduction of the PBQ item to reflect the percentage of bused students who are bused to promote ethnic balance. About one percent of the students who are bused are bused for this reason (as of the 1976-77 school year).

Parent-Community Involvement. Ths composite combines items from both the PQA and PQB with teacher data (items from TQA, TQB, and TQC which are aggregated to the school level), to provide a general measure of the amount of parent and community involvement in the school's programs. Table 8-28 presents the projected mean and standard deviation for this composite, along with the internal-consistency reliability and the unweighted item-total correlations. In addition, Table 8-28 presents similar information for 12 other composites based on data from the Principal Questionnaires.

Table 8-26

Ethnic Composition of School Staff (Projected to the National Population)

Item Content	Percentage of Schools in Each Category of Concentration of Each Group						
	0%	1-10%	11-20%	21-30%	31-40%	41-50%	51+%
Indicate the percent of staff members (teachers, administrators, instructional support, clerks or secretaries, or aides) who belong to the racial or ethnic groups listed below							
American Indian/Alaskan Native	94.2*	3.5	1.7	0.0	0.0	0.0	0.7
Asian or Pacific Islander	87.6	10.7	0.8	0.0	0.0	0.0	0.9
Black/Negro	60.8	13.5	9.7	6.1	2.4	2.9	4.6
Caucasian/White	1.7	0.3	1.7	1.4	1.2	2.1	91.6
Hispanic	87.3	6.5	0.9	2.7	1.6	1.0	0.0
Percentage of professional** staff that is minority	50.1	18.2	8.7	8.4	3.6	5.4	5.7
Percentage of support staff** that is minority	66.6	1.1	6.6	4.1	4.3	2.2	15.0

* Numbers in the columns are percentages of schools that have the indicated percentage of each ethnic group (e.g., 94.2 percent of the schools have no American Indians or Alaskan Natives on their staffs).

**Professional staff includes teachers, administrators, and instructional support (counselors, speech therapists, librarians, etc.) and support staff includes aides and clerical personnel. Minority includes all who are not Caucasian/white.

Principal Experience and Training. All of the items for this composite are from the PQA. Together, they provide a general measure of the principal's background.

District Control of Instruction. This composite combines information from the District Questionnaire, PQB, and Teacher Questionnaires to express the degree of control that the district has over various aspects of the school's programs.

Principal's Instructional Leadership. Items from the PQA, PQB, and Teacher Questionnaires are combined here to express the degree to which principals provide leadership for their schools' educational programs.

Teacher Involvement in Instructional Decision Making. This composite combines items from both the Principal and Teacher Questionnaires to measure the degree of involvement teachers have in decision making related to the school's instructional programs.

School Emphasis on Teacher Training. A number of PQ items and one TQA item are combined in this composite to indicate a school's overall amount of training provided to the teachers.

Student Involvement in Instructional Decision Making. This composite parallels the 'Teacher Involvement in Instructional Decision Making' composite and measures the amount of input that students have in the school's decision-making process.

Table 8-27

Means and Standard Deviations of Four Composite Variables (Projected to the National Population)

Composit and Brief Description	Mean	S.D.
Staff/Student Ratio		
Number of Staff from PQB + Number of homeroom teachers from STLR divided by the student enrollment	0.07	0.03
Ratio of Support Personnel to Teaching Personnel		
Number of support staff from PQB divided by the number of teachers from STLR and PQB	0.15	0.12
Student Mobility Rate		
Percent of students moving from school attendance area plus percent of students moving into area, both from PQB	17.28%	18.39%
Busing to Promote Racial Balance		
Subitem from PQB	1.19%	6.24%

School Climate. This composite is essentially a measure of how satisfied the teachers are with the school in which they work, especially with regard to the amount of input they have in decision making.

Intergroup Relations. Items dealing with both student and teacher racial/ethnic intergroup relations are combined in this composite.

Disruption of Instruction. Several PQ items and one TQA item are combined here to measure the amount of disturbance to instruction caused by such problems as fights, vandalism, truancy, and other disruptive behaviors.

Ability Grouping. The degree to which students are grouped or tracked by ability levels is the focus of this composite. Items are taken from the PQB and Teacher Questionnaires.

Stability of School for Long-Term Programs. This composite combines items from the Principal and Teacher Questionnaires to measure how permanent the staff and students at the school are, so that long-term programs are possible.

Belief That School Makes a Difference. This is an attitudinal measure designed to tap principals' and teachers' faiths in the power of education and beliefs that their students will improve.

DISTRICT EXPENDITURE QUESTIONNAIRE, PARTS B AND C

Although the data for the District Expenditure Questionnaire, Parts B (DEXB) and C (DEXC), were provided by the districts, the information is about the participating school and hence is reported here as school-level data. The DEXB provides general information about each school's regular and compensatory funding, while the DEXC provides fairly specific descriptions of how compensatory funds are spent (or at least allocated).

Table 8-28

Statistics for Thirteen Composites Based on Data From the Principal, District, and Teacher Questionnaires (Means and Standard Deviations Only Are Projected to the National Population)

Name	Parent Community Involvement	Principal Experience and Training	District Control of Instruction	Principal's Instructional Leadership	Teacher Involvement in Instructional Decision Making	School Emphasis on Teacher Training	Student Involvement in Instructional Decision Making	School Climate	Intergroup Relations	Disruption of Instruction	Ability Grouping	Stability of School for Long-Term Programs	Belief That School Makes A Difference
Range	15-84	5-49	13-54	30-76	26-56	2-214	0-13	24-45	9-15	17-132	6-12	10-16	16-41
Mean	40.26	26.12	40.95	53.08	39.98	28.94	0.84	34.26	11.98	46.97	8.67	14.09	27.97
S.D.	14.59	7.85	6.13	7.60	5.55	19.64	1.02	3.32	1.44	13.75	1.01	0.61	4.15
Alpha	.47	.45	.55	.76	.68	.49	.70	.73	.57	.62	.48	.34	.31
Component Items and Item-Composite Correlations	PQA8 .43 PQB12E .43 PQB13 .31 PQB14 .22 PQB15 .59 PQB16 .18 PQB18D .43 PQB19 .44 PQB20 .58 .31 PQB23A .52 PQB23B .60 PQB23C .39 PQB23D .61 TQA15E .11 TQA15F .33 TQB30E .49 TQB30F .42 TQB31E .32 TQB31F .35 TQC27E .41 TQC27F .34 TQC28E .23 TQC28F .29	PQA1 .03 PQA2 .67 PQA3B .5[illegible] PQA6A .18 PQA6B .31 PQA6C .36 PQA6D .37 PQA6E .33	DCHA5A .28 DCHA5B .28 DCHA6A .25 DCHA6B .25 DCHA7A .[illegible] DCHA7B .19 DCHA8 .24 DCHA9 .06 DCHA10H .28 DCHA11 .57 DCHA12A .34 DCHA12B .40 PQB12D .52 TQA15D .56 TQB30A .60 TQB31A .56 TQC27A .59 TQC28A .48	PQA4A .63 PQA4B .58 PQA5A .68 PQA5B .63 PQA11C .51 PQA13A .40 PQA13B .41 PQB12C .41 TQA15C .39 TQA16A .07 TQA16B .17 TQA16C .13 TQA16D .23 TQA16E .22 TQA16F .18 TQA20 .18 TQA21 .51 TQA22A .18 TQA22B .20 TQA24C .45 TQA24G .29 TQA24I .38 TQB30B .57 TQB31B .47 TQC27B .56 TQC28B .39	PQA9A .11 PQA9B .30 PQA9C .17 PQA9D .29 PQA9E .27 PQB12A .24 PQB12B .39 TQA15A .47 TQA15B .43 TQB8 .51 TQB9 .48 TQB30C .40 TQB30D .51 TQB31C .38 TQB31D .40 TQC7 .56 TQC8 .50 TQC27C .37 TQC27D .44 TQC28C .28 TQC28D .36	PQA11G .24 PQB24A x PQB25A .86 PQB26A* x PQB27A .79 PQB28 .57 PQB29A .14 TQA24G .15	PQB9H .35 PQB12F .74 TQA15G .69 TQB30G .73 TQB31G .68 TQC27G .73 TQC28G .68	PQA11E .54 PQA11F .41 PQB7 .22 TQA3 .24 TQA8 .28 TQA17A* – TQA16A .32 TQA17B* – TQA16B .41 TQA17C* – TQA16C .36 TQA17D* – TQA16D .52 TQA17E* – TQA16E .44 TQA17F* – TQA16F .31 TQA18 .66 TQA19 .55 TQA24E .58 TQA24F .61 TQA24J .64	PQA14 .85 PQA18 .73 TQA26 .69 TQA27 .27	PQA7A .21 PQA7B .44 PQA7C .54 PQA7D .74 PQA7E .68 PQA7F .77 PQA7G .49 PQA16 .33 PQA17 .38 TQA14D .43	PQB8A .49 PQB9 .55 TQA25A .62 TQB11B .59 TQC2 .50 TQC10B .58	PQA3A .29 PQB9F .56 PQB10 .36 PQB11 .35 TQA2 .28 TQB5 .45 TQC5 .43	PQA15 .62 TQA12E .27 TQA12F .16 TQB15D .71 TQC14D .66

*For 2 items in 'School Emphasis on Teacher Training', scoring was accomplished by multiplying the indicated items to obtain a measure of the total amount of inservice per scho[illegible]. For 6 items in 'School Climate', scoring was accomplished by taking the absolute value of the difference between parallel subparts of TQA items 17 and 16.

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Table 8-29

School Enrollments and Current Expenditures for Education (Projected to the National Population)

Item Content	Mean	S.D.
Please provide the ADA (ADM or Average Enrollment) and the Current Expenditure for Education for this school (excluding expenditures for compensatory education and summer programs).		
Average Daily Attendance	422	274
Current Expenditure for Education	$498,317	$428,723
Per-Pupil Current Expenditure for Education	$1,189	$461

Item 1 of the DEXB asks for the school's average daily attendance (ADA), and current expenditure for education, excluding compensatory funds. These data, plus the per-pupil expenditure, calculated by dividing total expenditure by the ADA, are presented in Table 8-29. The mean ADA is 422 students, and the mean current expenditure for regular education is $498,317, with a mean per-pupil expenditure of $1,189. These projected means have limited value due to the wide variability among schools as indicated by the large standard deviations.

Table 8-30 presents the per-pupil expenditures for compensatory services based on the SES sample, and calculated in two different ways. The different methods of calculation illustrate, in part, the problems encountered when expenditure data are collected from educational agencies. The figures in Table 8-30 that are not in parentheses were obtained by dividing the total expenditure for the school by the reported number of students served, both items of information from the district, via the DEX. Because the totals were used, the figures in Table 8-30 include expenditures for students in grades outside the 1-6 range — if the school has such grades. In addition, the figures were obtained by excluding from the calculations any schools that had $0 (zero dollar) expenditures in a given category. Thus, for those schools that had any district and/or state compensatory funding, the mean per-pupil expenditure is

Table 8-30

Per-Pupil Expenditures for Compensatory Services, by Funding Source (Figures are not Projected)

Funds for Compensatory Services in the Sample School	Number of Schools		Mean Per-Pupil Expenditure		S.D. Per Pupil Expenditure	
District or Special State Funds for Compensatory Services	92	[64]	$316	[$458]	$379	[$447]
ESEA Title I	157	[155]	$375	[$436]	$243	[$295]
ESAA Pilot/Basic or Other Federal Funding	28	[18]	$174	[$597]	$165	[$808]

$316. Likewise, for those schools that received any Title I funding, the mean per-pupil expenditure was $375. Finally, for those schools that received ESAA and/or other federal funding, the mean per-pupil expenditure was $174.

We also provide alternative figures in Table 8-30, and have placed them in brackets. Our reason was as follows: a number of discrepancies among responses on the DEX, PQB, and CER regarding the number of students selected for CE (or receiving it), and even regarding the school's receipt of CE funds, caused us to be suspicious of some entries on the DEX. We assumed that the figures for total expenditures were a matter of record and were probably fairly accurate, but that the counts of students served, while perhaps being a matter of record, were more subject to error or change. Therefore, we calculated, from data on the CERs and the attendance figures from the DEX, new counts of students-served to be used as divisors in the calculation of per-pupil expenditures. The new counts were essentially counts of students selected, as obtained from the CER, and prorated to the entire grade range of the school. The figures in brackets were calculated from the computed student counts.

As can be seen, there are many differences between the figures in Table 8-30. The differences in the number of schools arise in this way: some schools, reported to receive funds, report serving no students on the CER, and therefore are not counted in the calculations in parentheses. The differences probably occur because the funds (reported in the DEX but not associated with selected students in the CER) are specified for teachers' salaries, with no requirement for the specific selection of students (note that the discrepancy is very small for Title I, where students *are* selected). This difference explains, in part, the high teacher-salary expenditures for District/State and Other Federal programs reported in Table 8-31.

The differences in the two sets of expenditures in Table 8-30 arise in this way: Counts of students receiving services, when based on CER selection data prorated to the school's entire enrollment, are not as large as the official counts of children served, as reported by the district on the DEX. The same total expenditure, divided by a smaller number, yields larger per-pupil expenditures in all cases. It is not possible to suggest which entries in Table 8-30 are more accurate.

If one attempts to compare similar data to those parenthesized in Table 8-30 from Table 9-8 of Report 5 (Wang et al., 1978), it must be noted that for Report #5 we excluded all 'outlier' values of $1,000 or more from the computations, but did not exclude 'outlier' values that were very small. Because we were unsure of the appropriateness of any exclusory rule, we did not apply one to the data in this report. In any event, the caveat stated in Report #5, that "readers are advised to accept these data cautiously" bears repeating here.

Information obtained from the DEXC is presented in Table 8-31, which describes per-pupil compensatory expenditures by funding source (district/state, Title I, and ESAA/other federal), and by type of expenditure (staffing, training, supplies, etc.). Three explanations of analysis procedures are necessary here:

Table 8-31

Per-Pupil Expenditures for Compensatory Services, by Funding Source and by Expenditure Category

Expenditure Category	Compensatory Funding Source					
	District and Special State		ESEA Title I		ESSA Pilot/Basic and Other Federal	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Reading						
Teachers	$403	$519	$237	$140	$423	$583
Remedial and curriculum specialist, library/media personnel, teaching assistants, and teaching aides	$250	$334	$181	$193	$257	$412
Training of instructional and non-instructional staff	$ 35	$ 72	$ 11	$ 15	$ 19	$ 24
Administrative services and planning/evaluation	$ 30	$ 28	$ 30	$ 34	$ 35	$ 55
Instructional supplies (texts, AV aids, supplies)	$ 29	$ 28	$ 26	$ 27	$ 40	$ 50
Buildings, new equipment, other (benefits, travel)	$ 36	$ 41	$ 47	$ 56	$ 30	$ 18
Math						
Teachers	$275	$236	$223	$171	$114	$ 57
Remedial and curriculum specialists, library/media personnel, teaching assistants, and teaching aides	$124	$188	$109	$110	$293	$570
Training of instructional and non-instructional staff	$ 21	$ 26	$ 16	$ 21	$ 51	$ 84
Administrative services and planning/evaluation	$ 28	$ 38	$ 37	$ 53	$ 74	$161
Instructional supplies (texts, AV aids, supplies)	$ 40	$ 65	$ 21	$ 28	$ 26	$ 32
Buildings, new equipment, other (benefits, travel)	$ 21	$ 22	$ 42	$ 51	$ 22	$ 9
Community Activities						
Staff and material for school CAC, PTA, etc.	$ 8	$ 8	$ 22	$ 40	$ 71	$ 76
Other Costs						
Expenditures not included above	$ 41	$ 71	$ 94	$240	$118	$106

(1) The questionnaire asked only for total expenditures in each category. In order to convert these to per-pupil expenditures, it was necessary to have an accurate account of the number of pupils receiving each type of service. These counts were obtained by adjusting CER counts by enrollments and ADA figures from the DEX (as were the counts for the parenthesized figures in Table 8-30). This was done because the CER is considered to be more accurate than the figures provided in item 2 of the DEXB (e.g., a student who receives both district and state funded services would be counted twice in the DEXB, but only once in the CER). (2) The per-pupil means presented in Table 8-31 were obtained by excluding any schools in which there were $0 expenditures in a given category. Thus, the means are means of only those schools that had some funding in the category. Because we elected to provide these more meaningful entries, row or column totals would not be appropriate (because different numbers of schools enter into the calculation of each entry). (3) Expenditures for each funding source and for each category (as reported in DEXC) were assumed to be accurate. When the expenditures were divided by the calculated student counts, the quotients sometimes appeared to be quite unreasonable as per-pupil expenditues (which led us to make the aforementioned adjustments to the data reported in Report #5). The most unreasonable expenditures occurred for teacher and specialist salaries, probably making the Title I expenditures appear low by comparison (for example, the quotients for teachers funded by district and special state sources ranged from one school with a $17 per-pupil expenditure to another with a $2,625 per-pupil exenditure). Once again, caution is advised when interpreting these per-pupil expenditure figures.

PART IV. DISTRICT-LEVEL MEASURES

CHAPTER 9. MEASURES OF DISTRICT ORGANIZATION AND EXPENDITURES

In the previous parts of this report we have concentrated, sequentially, on measures of students, teachers and programs, and principals and schools, in the belief that the variables measured were the most important for understanding educational growth. In this chapter we address what we believe to be a less critical, but potentially important, set of variables. Characteristics of districts are far removed from the student in the classroom, but they have the potential for positive or negative impact on the student's achievement.

The instrumentation for districts was divided into three parts. A District Characteristics Questionnaire, Parts A and B, and a District Expenditure Information Questionnaire. Some of the composites in the previous chapters made use of these instruments at the school level. The following sections deal with information used to describe districts only.

Projections to the national population for districts are not exact, but are a close approximation. The assumption underlying the weights is that the districts were randomly sampled along with the associated schools. (Actually, the districts with more schools were more likely to be selected, but the stratification by district size counteracts this tendency.)

Table 9-1

District Enrollment and Staffing
(Projected to the National Population)

Item Content	Mean	S.D.
What was your total student enrollment (Grades K-12) on or about October 1 of this year?	3,783.4	19,870.0
For this school year, indicate the number of staff (full-time equivalent) in your district filling the positions listed below. (These staff titles are consistent with Staff Accounting, Classifications, and Standard Terminology for Local and State School Systems, 1974, Department of Health, Education, and Welfare.) If you use other names for your staff positions, please try to fit your categories into these titles.		
Official Administrative: Administrative Assistant, Superintendent, Assistant/Deputy/Associate Superintendent, Business Manager, Principal, Supervising/Managing/Directing/Coordination Personnel, Other Official Administrative Personnel	13.48	65.79
Professional: Curriculum Specialist, Counselor, Library/Media Personnel, Teacher, Psychologist, Therapist, Psychometrist, Community Relations Personnel, Planning, Evaluation, Research, and Development Personnel, Social Worker, Other	187.58	826.73
Technical/Office/Clerical: Student Teacher, Teaching Assistant, Teaching Intern, Teaching Aide, Office/Clerical, Other	66.85	551.65
District Administrative 'Top Heaviness': The percentage of total district staff that is administrative	5.4%	3.3%

DISTRICT CHARACTERISTICS QUESTIONNAIRE, PART A

Part A of the District Characteristics Questionnaire (DCHA) focuses on general information about the district. All of the data presented here for the DCHA have been projected to the national population, using the weighting procedure described above.

The first two items of the DCHA provide general descriptive information about the size of the districts, in terms of student enrollment and number of district staff. It may be seen in Table 9-1 that, on the average, there are about 4,000 students per district, and district staff consists of 13 administrators, 188 professionals, and 67 non-professionals. Notice the large standard deviations, however, that are caused by the wide range of district sizes.

One composite measure was developed from this questionnaire: 'District Administrative top-heaviness'. This composite was developed from Item 2 (number of district staff), and is simply the percentage of district staff who are administrative (i.e., number of administrative staff divided by total district staff). The mean and standard deviation for this composite are presented in Table 9-1. Notice that the percentage is quite small (about 5 percent).

Items 3 and 4, in Table 9-2, describe district testing practices. About 83 percent to 90 percent of the districts conduct district-wide testing of grades 1 through 6 at least once a year (note that about 10 percent of the districts say they never test grades 1 and 2). The results of these testings are reported in a variety of ways, from individual student scores to summary statistics for the entire district.

The next five items provide measures of how much control the district has over various educational practices. In Item 5 (Table 9-3), the majority of districts say that they favor a particular approach to instruction and actively promote it. Note that more districts do this for compensatory programs than for regular programs.

Table 9-2

District-Wide Achievement Testing
(Projected to the National Population)

Item Content	Percentage of Districts			
How frequently do you have district-wide (all or almost all students) achievement testing of the following grade levels?	At Least Once a Year	Every Other Year	Every Three or More Years	Never
Grade 1	85.2	2.2	1.4	11.2
Grade 2	82.7	4.9	2.3	10.1
Grade 3	89.6	6.3	1.6	2.5
Grade 4	87.7	6.2	2.5	3.6
Grade 5	88.0	6.2	2.2	3.6
Grade 6	89.1	5.3	2.5	3.1

Table 9-3

District Role in Regular and Compensatory Instruction (Projected to the National Population)

Item Content	Percentage of Districts	
	Regular Instructional Programs	Compensatory Instructional Programs
Which of the following statements best characterize the role of your district office with respect to regular and compensatory instructional programs in elementary schools in this district?		
The district office favors a particular approach to instruction and actively promotes it.	54.7	63.9
The district office favors a particular approach to instruction, but lets school staffs do as they think best.	45.3	36.1

In Item 6, presented in Table 9-4, the majority of districts say that they select the basic texts that are used in all the schools in the district.

In Item 7 (Table 9-5), the districts report that they have more control than the schools over the allocation of funds for instructional materials and instructional personnel. On the other hand, Item 8 (also in Table 9-5) indicates that the schools have a fair amount of freedom to determine procedures for communicating information on student performance to parents.

Table 9-4

District Policy on Elementary School Basic Texts (Projected to the National Population)

Item Content	Percentage of Districts	
	Reading	Math
How are the district's elementary school basic texts chosen for reading and mathematics?		
The state selects basic texts that are used in all schools throughout the district.	.3	.3
The district selects basic texts that are used in all schools throughout the district.	53.9	55.3
Schools may choose basic texts from an approved list that emphasizes a particular educational philosophy and approach.	17.8	18.0
Schools may choose basic texts from an approved list that includes materials with a range of contrasting instructional philosophies and approaches.	10.2	8.7
Each school selects its own text materials. There is no externally imposed list.	17.8	17.8

Table 9-5

District's Control of Fund Allocation, Communication of Student Performance, and Teacher Hiring (Projected to the National Population)

Item Content		
Mark where control primarily lies in the allocation of funds for materials and for personnel in your district.	**Instructional Materials**	**Instructional Personnel**
District has more control	59.6%	91.2%
Schools have more control	40.4%	8.8%
How much freedom do elementary school staffs have in determining procedures for communicating information on student performance to parents (e.g., student-teacher conferences, report cards)?		**Percentage of Districts**
Uniform procedures have been established at the district level.		36.7
The district has established general guidelines, but school staffs may develop individual approaches within the guidelines		53.7
Elementary school staffs may develop a reporting system consistent with their own instructional program.		9.6
Who is most influential in making decisions about teacher hiring?		**Percentage of Districts**
School board members		8.6
High level district administrators		56.8
Other district staff (e.g., personnel staff)		2.8
School principals		31.8

Finally, Item 9 indicates that in 57 percent of the districts, the district administrators are the most influential in decisions about teacher hiring, while in 32 percent of the districts the school principals are the most influential.

Table 9-6 presents data from Item 10, providing a brief description of teacher-contract issues. The issue most commonly included in such contracts is provision for preparation time during normal school hours for elementary teachers (52 percent of the districts with contracts).

The next two items, presented in Table 9-7, provide a description of performance evaluation practices in the districts. Item 11 asks how often formal performance evaluations are required for elementary school principals and teachers, and Item 12 asks how the performance review information is used. Item 11 was scored to provide a measure of the overall frequency of evaluations, and the mean responses indicate a high frequency (11.4 out of a possible 15). For probationary staff reviews are mostly conducted twice a year. For principals and non-probationary staff, most districts conduct reviews at least once a year. In the majority of

Table 9-6

Issues Covered in Master Contracts With Elementary School Teachers (Projected to the National Population)

Item Content		Percentage of Districts
Which of the following are covered in your master contract with the organization recognized as the bargaining agent for elementary school teachers in your district?		
Does not apply. Our district has no such contract.		32.0
Teacher participation in selection of classroom materials.		21.7
Preparation time during normal school hours for elementary teachers.		35.1
Teacher participation in budgeting.		7.1
Teacher participation in program planning and evaluation.		21.3
Staffing and class size.		14.2
We do have a contract, but it does not cover the issues.		27.7
Total number of instructional concerns on contract	Mean	1.46
	S.D.	1.55

districts, the evaluation information is used to provide specific feedback to the person reviewed, and a specific plan is developed to improve performance.

The last item (Table 9-8) lists a number of approaches to elementary education, and asks the districts to indicate how many of their schools emphasize these approaches. The most commonly emphasized approaches are (1) concentration on basic skills, (2) use of remedial reading specialists, and (3) diagnostic-prescriptive instruction: while the least common were (1) "open" classrooms, (2) classroom management systems, and (3) team teaching.

DISTRICT EXPENDITURE QUESTIONNAIRE, PART A

The District Expenditure Questionnaire, Part A (DEXA), was designed to obtain information from district business managers about district-level expenditures for the districts in the SES sample. School-level data (Parts B and C) from the DEX have already been presented in Chapter 8. Here only those data that describe district-level expenditures are presented.

In instances where the DEXA items are intended to describe *all* districts, weighting has been used to provide projections to the national population of districts. However, some items are intended to describe only a subset of districts, e.g., only those districts that participate in Title I; in these instances only the data for the specific subset of districts were included in the calculation, and no weighted projections were made.

Items 1 and 2 of the DEXA, presented in Table 9-9, provide a general description of the districts in terms of average daily attendance (ADA), current expenditures for education (*excluding* compensatory funding), and the grade span of the district. The mean ADA is 3,544 students, but this varies widely among the districts, as indicated by the large standard deviation. A similar pattern holds for the current expenditure, with a mean of more than $4.5 million, and a standard deviation of over $27 million. Item 28 indicates that the districts typically have a total grade span of 12 grades (with some districts also including kindergarten).

Table 9-7

Staff Performance Evaluations
(Projected to the National Population)

Item Content	Percentage of Districts					
How many times per year are formal performance evaluations required for elementary school personnel in your district?						
	Twice a Year	Once a Year	Every 2 Years	Every 3-5 Years	Every 6 or More Years	Never
Elementary school principals	10.4	67.2	0.6	2.0	0.0	19.9
Non-probationary elementary teachers	33.3	45.6	7.3	4.3	0.0	9.5
Probationary elementary teachers	70.6	19.3	0.1	1.7	0.0	8.3

How is performance review information for nonprobationary teachers and principals used?		
	Teachers	Principals
The person who was reviewed is informed of strengths and weaknesses	29.8	29.2
Promotions, raises, transfers, etc., are influenced by the review	0.7	0.7
A plan, including specific actions to be taken and objectives to be achieved is provided to the person who was unfavorably reviewed	66.8	51.5
Feedback is not provided to the person who is reviewed, nor are there likely to be any consequences resulting from either a favorable or unfavorable review	0.0	0.0
Performance reviews are not conducted	2.7	18.5

Table 9-8

Approaches in Elementary Education (Projected to the National Population)

Item Content	Percentage of Schools Per District	
	Mean	S.D.
Listed below are a number of approaches in elementary education. Please estimate the percentage of elementary schools in your district in which each of these approaches is emphasized.		
Combined grades and/or ungraded classes	39.2	42.8
Diagnostic-prescriptive instruction	55.1	47.9
Concentration on basic skills	82.6	35.8
Classroom management systems	15.8	35.1
"Open" classroom instructional approaches	10.1	26.1
Tutoring	49.2	47.0
Parent involvement in the classroom	30.4	41.9
Early childhood education programs	32.5	42.3
Remedial reading specialists	62.2	43.2
Team teaching	20.9	34.5

Items 3 and 4 (Table 9-10) provide a description of district-level compensatory funding. The reader should be aware that districts that reported *no* compensatory funding were excluded from these calculations. Note that Title I funding in both public and non-public schools is, on the average, higher per pupil than other compensatory funding. (Differences from figures in Chapter 8 are probably caused by a district's inclusion of secondary programs and district administrative costs that are not included in Table 8-30). Note also, however, the large standard deviations for all funding sources, indicating a great deal of variability in per-pupil compensatory funding.

Table 9-11 presents the data from Item 5, indicating the years during which districts have participated in ESEA Title I. About 2 percent of the sample districts have *never* received Title

Table 9-9

District Average Daily Attendance, Current Expenditures, and Grade Span (Projected to the National Population)

Item Content	Mean	S.D.
Average Daily Attendance (or ADM or Average Enrollment) of students in your district	3,544	18,200
District's current expenditures for education, excluding funds for compensatory and summer services	$4,680,418	$27,177,875
Number of grades in district	12.28	1.61

Table 9-10

District Compensatory Expenditures Per Pupil (Figures NOT Projected)

District Compensatory Expenditures	Estimated Per-Pupil Expenditures 1976-77	
	Mean	S.D.
Special district or state funding for compensatory services	$371	$573
ESEA Title I	$415	$236
ESAA Pilot/Basic and other federal funding for compensatory services	$297	$306
Title I funds for services to students in non-public schools	$413	$624

I funds and, of those districts that *have* received Title I funds, the mean number of years they have received such funds is about 11 years. The majority of districts began participating during the first year of the Title I program and have continued to participate.

Table 9-11

Percentages of Districts Receiving ESEA Title I Funds in Each Year from 1965 to 1977 (Projected to the National Population)

Item Content		Percentage of Districts
Please put a check beside each year in which your district has received ESEA Title I funds.		
Has never received Title I funds	—	1.5
	1965–66	69.6
	1966–67	75.7
	1967–68	77.9
	1968–69	80.3
	1969–70	85.4
	1970–71	87.6
	1971–72	91.4
	1972–73	91.6
	1973–74	91.1
	1974–75	92.2
	1975–76	95.1
	1976–77	95.1
Total number of years in which Title I funds have been received. (Not projected to the national population)		Mean = 11.12 Years S.D. = 2.09 Years

CHAPTER 10. MEASURES OF TITLE I PROGRAM CHARACTERISTICS

In this last chapter, data are presented on the characteristics of Title I programs at the district level. In most cases, it is the district that has the most organized management and administrative control of the program, so information on those aspects was obtained from district respondents.

DISTRICT CHARACTERISTICS QUESTIONNAIRE, PART B

Part B of the District Characteristics Questionnaire (DCHB) focuses specifically on Title I programs. The first eight items were to be answered by all districts, while the remaining items (9 through 25) were to be answered only by those districts that were participating in Title I. Thus, it was possible to provide weighted projections to the national population only for the first eight items. The data for the remaining items are sample-descriptive only for the Title I districts in the SES sample.

Item 1 of the DCHB (Table 10-1) provides a description of how many districts are participating in Title I, and why non-participating districts are not. Almost 94 percent of the districts are participating, while 3 percent say that they do not qualify for Title I. An additional 2.5 percent chose not to apply, and 1 percent said they did not have the personnel needed to prepare a proposal.

Items 2, 3, 4, and 7 are presented in Table 10-2. They provide basic descriptive information about the schools in the districts. (Items 5 and 6 have been omitted from this report because they are of little general use; their purpose was simply to provide SES with eligibility information on specific Title I schools). Item 2 indicates that there are, on the average, 5 elementary

Table 10-1

Districts' Reasons for Not Participating in Title I (Projected to the National Population)

Item Content	Percentage of Districts
Some districts may be eligible to participate in Title I, but are not participating. If your district qualified for Title I this year, but is not participating, what is the reason?	
Does not apply. This district currently participates in Title I.	93.7
Does not apply. This district does not qualify for Title I.	2.9
District did not apply for Title I because personnel were not available to prepare a proposal.	0.9
District did not apply for Title I because the district chose not to participate in the Title I Program.	2.5
District application for Title I was submitted, but was not approved.	0.0
Other	0.0

Table 10-2

District Demographics
(Projected to the National Population)

Item Content	Mean	S.D.
How many elementary schools are there in this district?	5.32	17.86
How many elementary schools in this district were eligible for this year's Title I program?	3.77	8.68
How many elementary schools are participating in the Title I program?	3.55	7.22
Please estimate the percentage of students in your district meeting the Title I poverty criteria this year.	23.85	17.74

schools per district (but this varies widely), and item 3 indicates that about 4 elementary schools per district are eligible for Title I, and 3 to 4 schools per district are actually participating in Title I (Item 4). Again, these figures vary widely among districts. Finally, Item 7 indicates that, on the average, about one-fourth of the students per district meet the Title I poverty criteria.

Item 8 (Table 10-3) asked the districts to describe how they determined the Title I eligibility of their schools. The most common measure is counts of students who receive free or reduced-price lunches, but other measures are also used by many districts.

The reader should keep in mind that the remainder of the items presented here were answered only by the 213 Title I districts, and therefore national projections are not presented. Table 10-4 presents data from 3 items. In Item 9 the Title I districts were asked to indicate how they determine the amount of funds available for Title I schools. Here, 32 percent of the districts

Table 10-3

Districts' Methods for Determining Eligibility
of Schools for Title I
(Projected to the National Population)

Item Content	Percentage of Districts
Which of the measures listed below are used to determine the eligibility of public schools in the district for this year's Title I program?	
Does not apply. This district does not participate in Title I.	6.3
Census data on family income.	41.5
AFDC enrollment.	56.6
Free or reduced-price breakfast counts.	12.0
Free or reduced-price lunch counts.	73.1
Number of neglected or delinquent children served by district.	28.6

Table 10-4

Sample Statistics of Districts' Allocations of Title I Funds, Policies for Selecting Students for Title I, and Allocations of Non-Title I Funds to Schools

Item Content	Percentage of Districts
What statement best characterizes the manner in which your district determines the amount of Title I funds available for participating schools?	
Does not apply. Title I funds are used to provide a district-level project, rather than school-level projects.	32.4
All schools that participate in Title I have the same amount of Title I funds available.	11.3
All participating schools have available a percentage of the district's Title I funds, based on each school's total enrollment.	9.4
Participating schools in the district are rank-ordered using poverty-related information. The number of students below a certain achievement level at each school is determined. Then the allocated money per student times the number of students determines each school's share of the district's Title I funds.	18.3
All participating schools have available a percentage of the district's Title I funds based on each school's percentage of the total number of children from low-income families in the district.	5.2
All participating schools have available a percentage of the district's Title I funds based on the number of low-achieving students in each school.	23.5
What is your district policy for the selection of students to receive Title I services?	
There is no district policy. Each school establishes its own criterion.	0.0
Primarily through standardized achievement tests.	53.5
Primarily through locally-developed achievement tests.	0.5
Primarily through teacher judgment.	2.3
Primarily through an equal weighting of achievement tests and teacher judgment.	43.7
If your district receives compensatory funds in addition to Title I funds, on what basis are most of these additional funds allocated to schools?	
Does not apply. This district does not receive compensatory funds from other sources.	43.7
The money is used to provide additional services to students already participating in Title I projects.	15.0
The money is used to provide services to additional low-achieving students who are not receiving Title I services.	41.3

said that they use Title I funds to provide district-level programs. The most common allocation method for school-level programs is to allocate a percentage of funds proportional to the number of low-achieving students in each school. Item 10 describes how students are selected to receive Title I services. Selection is typically based on standardized achievement test scores (54 percent of the districts), or a combination of test scores and teacher judgment (44 percent of the districts). Item 11 identifies how other (non-Title I) compensatory funds are used. About 44 percent of the Title I districts do not receive other compensatory funds. Of those that do receive such funds, most say that the funds are used to provide services to students who are not receiving Title I services.

Item 12, in Table 10-5, provides more information on how Title I funds are used. About 53 percent of the Title I districts say that most of the funds are used to support a district-operated project, and 25 percent say that most of the funds go to projects in which several schools are implementing similar programs. Where there are district-level projects or similar programs among schools, Item 13 (Table 10-6) describes the extent of participation in the program by school staff, school PAC, and district PAC. School staffs are very active participants while the school and district Parent Advisory Councils are less active.

Items 14 and 15 are presented in Table 10-7. They provide a description of the district's Title I Administrator: typically this person is of the rank of a supervisor/manager/director, and spends about half time on Title I tasks.

The scoring procedure for Item 16 (Table 10-8) was designed to provide an indication of the extent of communication efforts concerning Title I programs within the district. The overall score can range from 0 to 40, and the mean for the SES Title I districts is about 26. While such a score tells us very little in and of itself, it is useful in relational analyses as a relative measure of communication efforts.

Table 10-5

Sample Statistics Describing Types of Title I Projects Supported by Districts' Title I Funds

Item Content	Percentage of Districts
Which of the following best describes how Title I funds are used in your district?	
Most of the funding goes to support a district-operated project.	53.1
Most of the funding goes to projects that are unique to individual schools	10.3
Most of the funding goes to projects in which several schools are implementing similar programs.	24.9
The district allocates nearly equal amounts of Title I funds to two or all three of the options listed above.	11.7

Table 10-6

Sample Statistics Describing Participation of Staff and Parent Advisory Councils in Title I Projects

Item Content	Mean	S.D.
If several schools in your district are implementing highly similar Title I projects, or are participating in a district-level project, in how many areas do the following groups actively participate? The five areas of participation are: conducting needs assessments, setting project objectives, determining instructional procedures, selecting materials, equipment, evaluating the project.		
School Staffs	4.68	0.85
School Title I Parent Advisory Council	2.29	1.51
District Title I Parent Advisory Council	2.87	1.01

The next two items, presented in Table 10-9, focus on the role of the district Parent Advisory Council. Item 17 describes how these councils are involved in planning Title I programs. In most instances, there are regularly scheduled meetings where plans are discussed (78 percent of the Title I districts), and the council is provided with briefings on district plans by district Title I staff members (68 percent of the districts). Item 18 describes the training provided to the council members. The most commonly mentioned training topics are (1) needs assessment, program planning, program evaluation procedures, and (2) how Title I works at the national, state, and local level. Only 8 percent of the Title I districts do not provide any training to their councils.

The remainder of the items in the DCHB requested information about Title I programs for non-public school students. Such programs are available in 54 percent of the Title I districts

Table 10-7

Sample Statistics Describing District Title I Administrators

Item Content	Percentage of Districts	
In your district, what is the rank of the person with responsibility for administrative direction of the Title I Program?		
Superintendent	8.5	
Assistant/Deputy/Associate/Area Superintendent	15.0	
Supervisor/Manager/Director/Coordinator	70.4	
Assistant Principal	2.3	
Teacher	3.8	
What percentage of time does the person with responsibility for your district Title I program devote to Title I program activities?	Mean	51.5%
	S.D.	37.3%

Table 10-8

Frequencies of District Title I Communication Procedures

Item Content	Mean	S.D.
Many persons are concerned with Title I: Board of Education members, district administrators, principals, teachers, parents and members of advisory councils. During this school year how many times per year did your district use the following procedures to keep such persons informed about the district Title I programs?		
District-wide meetings of all concerned persons	2.51	1.89
Meetings of principals of Title I schools	3.80	1.46
Meetings of teachers of Title I schools	4.00	1.45
Meetings of District Title I Parent Advisory Council	3.93	1.25
Meetings of School Title I Parent Advisory Councils	3.87	1.28
Presentations of Title I information to the Board of Education	2.34	1.39
Presentations in district publications not specifically devoted to Title I	2.45	1.85
Stories in local news media	3.01	1.61
Total frequency of procedures	25.92	6.34

Table 10-9

Sample Statistics of Involvement and Training of the Districts' Parent Advisory Councils in Title I Programs

Item Content	Percentage of Districts
How is your District Title I Parent Advisory Council involved in planning the district's Title I program for the forthcoming year?	
We have no District Title I Parent Advisory Council.	1.4
District Parent Advisory Council is not involved in planning the program.	3.8
Through regularly scheduled meetings where plans are discussed.	78.4
Council is provided briefings on district plans by district Title I staff members.	67.6
Members are mailed information on district plans.	34.3
District Parent Advisory Council officers meet with district Title I staff to plan the district program.	46.5
What topics are covered in the training that is provided to members of the District Title I Parent Advisory Council?	
We have no District Title I Parent Advisory Council.	1.4
No training is provided the District Parent Advisory Council.	8.0
Parliamentary procedures.	26.3
How to get people to work together.	39.9
How Title I works at the national, state, and local levels.	82.6
Budget preparation.	52.6
Needs assessment, program planning, program evaluation procedures.	85.9

Table 10-10

Sample Statistics of Students' Receipt of Title I Services in Non-Public Schools

Item Content	Percentage of Districts
Do non-public school students receive Title I services in your district:	
Yes	53.5
No	46.5
How are non-public school students selected to receive Title I services? (Mark all that apply.)	
Primarily through standardized achievement tests	63.2
Primarily through locally-developed achievement tests	2.6
Primarily through teacher judgment	6.1
Primarily through an equal weighting of achievement tests and teacher judgment.	34.2
What arrangement best characterizes the method of delivering Title I services to students in non-public schools? (Mark all that apply.)	
Services are provided at the non-public school	85.1
Non-public school students participate in school-level projects at a public elementary school	13.2
Services are provided at a site other than a school (e.g., a community center, a public building, a leased building)	2.6
A mobile facility comes to the non-public school to provide services	3.5
Of the grades listed below, in which ones do non-public school elementary students receive Title I services in your district?	
Does not apply. This district does not provide Title I services to non-public school students in the grades listed below.	3.5
Grade 1	82.5
Grade 2	90.4
Grade 3	90.4
Grade 4	84.2
Grade 5	78.9
Grade 6	76.3
At what times are Title I services provided to non-public school students in your district? (Mark all that apply.)	
During normal school hours	91.2
Before normal school hours	4.4
After normal school hours	7.0
On weekends	1.8
During summers	19.3

as indicated by Item 19 in Table 10-10. Statistics on the Title I programs are based on the responses from those 114 districts. Title I services for non-public school students are provided in grades 1 through 6 (by over three-fourths of the Title I districts for each grade level), and the services are usually provided during normal school hours (Items 24 and 25 in Table 10-10).

Table 10-11

Funding and Services of Title I Programs in Non-Public Schools

Item Content	Percentage of Districts
For which of the following are Title I funds for non-public school students spent in your district?	
Purchase of instructional materials	80.7
Purchase of equipment	56.1
Purchase of testing materials	68.4
Salaries of teaching assistants or teacher aides	53.5
Salaries of public school teachers	62.3
Salaries of instructional personnel who provide services after the normal school day, on weekends, or during summers	17.5
Provision of inservice training to instructional personnel	58.8
What kinds of Title I services are provided for non-public school students in your district?	
Compensatory reading instruction	96.5
Compensatory mathematics instruction	66.7
Instruction in other basic skill areas	15.8
Activities concerned with intergroup relations	6.1
Counseling activities	18.4
Health services	19.3
Nutritional services	1.8
Activities concerned with parent involvement	51.8

Students are usually selected for Title I by means of standardized achievement tests (Item 20), and the services are provided at the non-public schools (Item 21).

Title I funds for students in non-public schools are spent for a variety of purposes (materials, equipment, salaries, and in-service training), and the subject areas are most commonly reading, math, and/or parent involvement activities. These data come from items 22 and 23 in Table 10-11.

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APPENDIX A

CONVERSION TABLES FOR PERCENTILE RANKS AND VERTICAL SCALE SCORES

CAPTIONS FOR TABLE A-1 THROUGH A-30:

MPRS Non-debiased mathematics test for the SES (no items are eliminated from the publisher's CTBS mathematics subtests due to bias, and thus there is no corresponding debiased test).

RDBRS Debiased reading test for the SES (0 to 3 biased items are eliminated from the publisher's CTBS reading subtests).

RFRS Non-debiased reading test for the SES.

TDBRS Debiased basic skills test, a combination of mathematics and the debiased reading tests, for the SES.

TPRS Non-debiased basic skills test, a combination of mathematics and the non-debiased reading tests, for the SES.

g.0-g.2 Norms established for tests administered in September-October.

g.6-g.9 Norms established for tests administered in April-May.

The numbers of items and the number of response alternatives per item, the items deleted for the debiased scores, and the names of skill areas in each named score are provided in Table 1-1 of this report.

Table A-1

LEVEL A: RAW SCORE TO PERCENTILE RANK, BEGINNING OF GRADE 1 (1.0-1.2)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	2	1	1	1	1
009	4	1	1	1	1
010	6	1	1	1	1
011	9	1	1	1	1
012	13	2	2	1	1
013	17	2	2	1	1
014	22	3	3	1	1
015	28	4	4	1	1
016	35	5	5	1	1
017	42	7	6	1	1
018	50	8	7	1	1
019	58	9	9	1	1
020	67	11	10	1	1
021	75	12	11	1	1
022	82	14	13	2	2
023	88	15	14	2	2
024	93	17	16	3	2
025	97	18	17	3	3
026	99	20	18	4	4
027		22	20	5	5
028		24	22	6	5
029		26	23	7	6
030		28	25	8	7
031		31	27	9	8
032		33	29	10	9
033		36	32	11	10
034		38	34	12	11
035		41	37	13	12
036		44	39	14	13
037		47	42	16	14
038		50	45	17	16
039		53	48	18	17
040		57	51	19	18
041		61	54	21	20
042		65	57	22	21
043		71	61	24	22
044		76	66	25	23
045		83	71	27	25
046		90	77	29	27
047		97	84	30	28
048			93	32	30
049			97	34	32
050				36	33
051				38	35
052				41	37
053				43	39
054				45	41
055				48	44
056				50	46
057				53	48
058				56	51
059				59	54
060				62	57
061				65	59
062				68	62
063				72	65
064				75	69
065				79	72
066				83	76
067				86	79
068				90	83
069				93	86
070				96	90
071				98	93
072				99	96
073				99	98
074					99
075					99

Table A-2

LEVEL B: RAW SCORE TO PERCENTILE RANK, BEGINNING OF GRADE 1 (1.0-1.2)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	2	2	1	1
005	3	3	3	1	1
006	4	5	5	1	1
007	7	7	7	1	1
008	9	11	11	1	1
009	13	16	16	1	1
010	17	23	23	1	1
011	21	31	31	2	2
012	27	40	40	2	2
013	33	49	49	3	3
013	33	49	49	3	3
014	40	58	58	4	4
015	47	65	65	4	4
016	54	72	72	6	6
017	61	77	77	7	7
018	67	81	81	9	9
019	72	84	84	11	11
020	76	87	87	14	14
021	80	88	88	17	17
022	83	90	90	20	20
023	86	91	91	24	24
024	88	92	92	28	28
025	90	93	93	33	33
026	91	93	93	38	38
027	93	94	94	42	42
028	94	94	94	47	47
029	94	95	95	52	52
030	95	95	95	57	57
031	96	95	95	61	61
032	97	96	96	65	65
033	97	96	96	69	69
034	98	96	96	72	72
035	98	97	97	75	75
036	98	97	97	77	77
037	99	97	97	79	79
038	99	98	98	81	81
039	99	98	98	83	83
040	99	98	98	84	84
041	99	99	99	85	85
042	99	99	99	86	86
043	99	99	99	88	88
044	99			89	89
045	99			90	90
046	99			90	90
047				91	91
048				92	92
049				92	92
050				93	93
051				93	93
052				93	93
053				94	94
054				94	94
055				95	95
056				95	95
057				95	95
058				96	96
059				96	96
060				97	97
061				97	97
062				97	97
063				97	97
064				97	97
065				98	98
066				98	98
067				98	98
068				98	98
069				98	98
070				99	99
071				99	99
072				99	99
073				99	99
074				99	99
075				99	99
076				99	99
077				99	99
078				99	99
079				99	99
080				99	99
081				99	99
082				99	99
083				99	99
084				99	99
085				99	99
086				99	99
087				99	99
088				99	99
089					

Table A-3

LEVEL B: RAW SCORE TO PERCENTILE RANK, BEGINNING OF GRADE 2 (2.0-2.2)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	2	2	1	1
010	2	3	3	1	1
011	2	4	4	1	1
012	3	5	5	1	1
013	4	6	6	1	1
014	5	8	8	1	1
015	7	9	9	1	1
016	8	11	11	1	1
017	11	13	13	1	1
018	13	15	15	1	1
019	16	16	16	1	1
020	18	18	18	1	1
021	21	20	20	1	1
022	23	21	21	2	2
023	26	23	23	2	2
024	29	25	25	2	2
025	32	26	26	3	3
026	34	28	28	3	3
027	37	30	30	4	4
028	40	32	32	5	5
029	43	34	34	5	5
030	46	36	36	6	6
031	49	38	38	7	7
032	52	40	40	8	8
033	56	43	43	8	8
034	59	46	46	9	9
035	62	49	49	10	10
036	65	52	52	11	11
037	69	56	56	12	12
038	72	61	61	13	13
039	76	67	67	14	14
040	79	74	74	15	15
041	83	81	81	16	16
042	87	89	89	17	17
043	91	96	96	18	18
044	94			19	19
045	97			20	20
046	99			21	21
047				23	23
048				24	24
049				25	25
050				26	26
051				27	27
052				29	29
053				30	30
054				31	31
055				33	33
056				34	34
057				36	36
058				37	37
059				39	39
060				40	40
061				42	42
062				44	44
063				45	45
064				47	47
065				49	49
066				51	51
067				53	53
068				55	55
069				57	57
070				59	59
071				61	61
072				63	63
073				65	65
074				67	67
075				70	70
076				72	72
077				74	74
078				77	77
079				79	79
080				82	82
081				85	85
082				87	87
083				89	89
084				92	92
085				94	94
086				96	96
087				98	98
088				99	99
089				99	99

Table A-4

LEVEL C: RAW SCORE TO PERCENTILE RANK, BEGINNING OF GRADE 2 (2.0-2.2)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	3	1	1	1	1
008	5	1	1	1	1
009	7	2	2	1	1
010	11	4	4	1	1
011	15	6	6	1	1
012	20	9	8	1	1
013	26	12	11	1	1
014	31	16	15	1	1
015	36	19	18	1	1
016	42	23	22	1	1
017	47	27	26	1	1
018	52	30	29	2	2
019	56	34	32	2	2
020	61	37	35	4	3
021	65	39	38	5	4
022	69	41	41	7	6
023	73	44	43	8	8
024	77	46	45	10	10
025	80	48	47	12	12
026	82	50	49	14	14
027	85	52	51	17	16
028	87	54	53	19	18
029	89	56	55	21	20
030	92	58	56	23	22
031	94	59	58	26	25
032	95	61	60	28	27
033	96	62	61	30	29
034	97	64	63	32	31
035	98	66	64	34	33
036	99	67	66	35	35
037	99	69	67	37	36
038	99	71	69	39	38
039	99	73	71	41	40
040	99	75	73	42	41
041		77	75	44	43
042		80	77	46	45
043		82	80	48	47
044		85	83	49	49
045		88	85	51	50

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
046		91	88	53	52
047		94	91	54	53
048		96	94	56	55
049		98	96	57	56
050		99	98	58	57
051			99	60	59
052				61	60
053				63	61
054				64	63
055				66	64
056				67	66
057				68	67
058				70	69
059				71	70
060				73	71
061				74	73
062				76	74
063				78	76
064				79	78
065				81	79
066				82	81
067				83	82
068				85	83
069				86	85
070				87	86
071				89	87
072				90	89
073				91	90
074				92	91
075				93	92
076				94	93
077				95	94
078				96	95
079				97	96
080				97	97
081				98	97
082				98	98
083				99	98
084				99	99
085				99	99
086				99	99
087				99	99
088				99	99
089				99	99
090					99
091					

Table A-5

LEVEL C: RAW SCORE TO PERCENTILE RANK, BEGINNING OF GRADE 3 (3.0-3.2)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	2	1	1	1	1
011	3	1	1	1	1
012	4	2	2	1	1
013	5	3	2	1	1
014	7	4	3	1	1
015	9	5	4	1	1
016	11	6	5	1	1
017	13	7	7	1	1
018	15	8	8	1	1
019	18	10	9	1	1
020	21	11	10	1	1
021	24	12	12	1	1
022	27	13	13	1	1
023	30	14	14	1	1
024	33	15	15	2	1
025	37	17	16	2	2
026	40	18	17	2	2
027	44	19	19	3	2
028	48	21	20	3	3
029	51	22	21	3	3
030	55	23	22	4	4
031	59	24	23	5	5
032	63	26	25	6	5
033	67	27	26	6	6
034	71	28	27	7	7
035	76	30	29	8	7
036	80	32	30	8	8
037	85	34	32	9	9
038	90	36	34	10	9
039	95	38	36	11	10
040	99	40	38	11	11
041		43	41	12	12
042		46	43	13	13
043		50	46	14	14
044		55	50	15	14
045		60	55	16	15
046		66	60	16	16
047		72	66	17	17
048		80	72	18	18
049		88	80	19	19
050		96	88	20	20
051			96	22	21
052				23	22
053				24	23
054				25	24
055				26	25
056				27	26
057				28	27
058				30	28
059				31	30
060				32	31
061				34	32
062				35	34
063				37	35
064				38	37
065				40	38
066				41	40
067				43	42
068				45	43
069				47	45
070				49	47
071				51	49
072				53	51
073				56	54
074				58	56
075				60	58
076				63	60
077				65	63
078				67	65
079				70	67
080				73	70
081				75	73
082				78	75
083				81	78
084				84	81
085				87	84
086				90	87
087				93	90
088				96	93
089				98	96
090				99	98
091					99

Table A-6

LEVEL 1: RAW SCORE TO PERCENTILE RANK, BEGINNING OF GRADE 3 (3.0-3.2)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	1	1	1	1	1
011	1	1	1	1	1
012	2	1	1	1	1
013	3	1	1	1	1
014	4	2	2	1	1
015	5	3	3	1	1
016	7	4	4	1	1
017	8	6	5	1	1
018	11	8	7	1	1
019	13	10	10	1	1
020	16	13	12	1	1
021	18	16	15	1	1
022	21	19	18	1	1
023	24	23	22	1	1
024	26	26	25	1	1
025	29	29	28	1	1
026	32	32	31	1	1
027	35	35	34	1	1
028	38	37	36	1	1
029	41	40	39	2	2
030	43	41	41	2	2
031	46	43	42	3	2
032	49	45	44	3	3
033	52	46	46	4	4
034	54	48	47	5	4
035	57	49	49	6	5
036	60	51	50	7	6
037	63	52	52	8	8
038	65	54	53	9	9
039	67	55	54	11	10
040	70	56	56	12	12
041	72	58	57	14	13
042	74	59	58	15	15
043	77	60	59	17	16
044	79	62	61	18	18
045	80	63	62	20	20
046	82	64	63	22	21
047	84	65	65	24	23
048	85	67	66	25	25
049	87	68	67	27	25
050	88	69	68	28	27
051	89	71	69	29	29
052	90	72	71	31	30
053	91	73	72	32	31
054	92	74	73	33	33
055	93	75	74	34	34
056	94	77	75	36	35
057	94	78	77	37	37
058	95	79	78	38	38
059	96	80	79	39	39
060	96	81	80	41	40
061	97	83	81	42	41
062	97	84	83	43	43
063	98	85	84	44	44
064	98	87	85	45	45
065	99	88	86	46	46
066	99	89	87	47	47
067	99	90	89	48	48
068	99	91	90	49	49
069	99	92	91	50	50
070	99	93	92	51	51
071	99	94	93	52	52
072	99	95	94	53	53
073	99	96	95	54	54
074		97	95	55	55
075		98	96	56	55
076		98	97	57	56
077		99	98	58	57
078		99	98	59	58
079		99	99	60	59
080		99	99	61	60
081		99	99	62	61
082		99	99	63	62
083		99	99	64	63
084			99	65	64
085			99	66	65
086				67	66
087				67	67
088				68	68
089				69	69
090				70	70
091				71	70
092				72	71
093				73	72
094				74	73
095				75	74
096				75	75
097				76	75
098				77	76
099				78	77
100				79	78
101				80	79
102				80	79
103				81	80
104				82	81
105				83	82

Table A-6 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				84	83
107				84	83
108				85	84
109				86	85
110				87	86
111				87	86
112				88	87
113				89	88
114				89	88
115				90	89
116				90	90
117				91	90
118				91	91
119				92	91
120				93	92
121				93	92
122				94	93
123				94	93
124				94	94
125				95	94
126				95	95
127				96	95
128				96	95
129				96	96
130				97	96
131				97	97
132				97	97

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
133				98	97
134				98	97
135				98	98
136				98	98
137				99	98
138				99	98
139				99	99
140				99	99
141				99	99
142				99	99
143				99	99
144				99	99
145				99	99
146				99	99
147				99	99
148				99	99
149				99	99
150				99	99
151				99	99
152				99	99
153				99	99
154				99	99
155				99	99
156					99
157					99
158					

Table A-7

LEVEL 1: RAW SCORE TO PERCENTILE RANK, BEGINNING OF GRADE 4 (4.0–4.2)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	1	1	1	1	1
011	1	1	1	1	1
012	1	1	1	1	1
013	1	1	1	1	1
014	1	1	1	1	1
015	1	1	1	1	1
016	2	2	2	1	1
017	2	3	2	1	1
018	3	3	3	1	1
019	3	5	4	1	1
020	4	6	5	1	1
021	5	7	7	1	1
022	6	9	8	1	1
023	7	10	10	1	1
024	7	12	11	1	1
025	8	14	13	1	1
026	9	15	15	1	1
027	10	17	16	1	1
028	12	19	18	1	1
029	13	20	19	1	1
030	14	21	21	1	1
031	16	23	22	1	1
032	17	24	23	1	1
033	19	25	25	1	1
034	20	27	26	1	1
035	22	28	27	1	1
036	23	29	28	2	2
037	25	30	30	2	2
038	26	32	31	2	2
039	28	33	32	3	3
040	30	34	33	3	3
041	32	35	34	4	4
042	33	36	35	4	4
043	35	38	37	5	5
044	37	39	38	5	5
045	39	40	39	6	6
046	41	41	40	6	6
047	43	43	41	7	7
048	45	44	43	7	7
049	47	45	44	8	8
050	49	46	45	9	8
051	51	48	47	9	9
052	53	49	48	10	10

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
053	55	51	49	10	10
054	57	52	51	11	11
055	59	54	52	12	12
056	61	55	54	13	13
057	63	57	55	14	13
058	65	58	57	14	14
059	68	60	58	15	15
060	70	61	59	16	15
061	72	63	61	16	16
062	75	64	62	17	17
063	77	66	64	18	17
064	79	68	66	19	18
065	82	70	67	19	19
066	84	72	69	20	20
067	87	73	71	21	21
068	89	75	73	22	22
069	92	77	74	23	22
070	95	79	76	23	23
071	97	81	78	24	24
072	99	84	80	25	24
073	99	86	82	25	25
074		88	84	26	26
075		90	86	27	27
076		92	88	28	27
077		94	90	29	28
078		95	92	30	29
079		97	94	30	30
080		98	96	31	31
081		99	97	32	31
082		99	98	32	32
083		99	99	33	33
084			99	34	34
085			99	35	34
086				35	35
087				36	36
088				37	36
089				38	37
090				39	38
091				40	39
092				41	40
093				42	41
094				43	42
095				44	43
096				44	44
097				45	44
098				46	45
099				47	46
100				48	47
101				49	48
102				49	49
103				50	49
104				51	50
105				52	51

Table A-7 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				53	52
107				54	53
108				55	54
109				56	55
110				57	56
111				58	57
112				59	58
113				60	59
114				61	60
115				62	61
116				63	62
117				64	63
118				65	64
119				67	65
120				68	66
121				69	67
122				69	68
123				70	69
124				71	70
125				72	71
126				73	72
127				74	73
128				76	74
129				77	75
130				77	76
131				78	77
132				79	78

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
133				80	79
134				82	80
135				83	81
136				84	82
137				85	83
138				86	84
139				88	86
140				89	87
141				90	88
142				91	89
143				92	90
144				93	91
145				94	92
146				95	94
147				96	94
148				97	95
149				98	96
150				98	97
151				99	98
152				99	98
153				99	99
154				99	99
155				99	99
156				99	99
157					99
158					99

Table A-8

LEVEL 1: RAW SCORE TO PERCENTILE RANK, BEGINNING OF GRADE 5 (5.0-5.2)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	1	1	1	1	1
011	1	1	1	1	1
012	1	1	1	1	1
013	1	1	1	1	1
014	1	1	1	1	1
015	1	1	1	1	1
016	1	1	1	1	1
017	1	1	1	1	1
018	1	2	1	1	1
019	1	2	2	1	1
020	2	3	2	1	1
021	2	3	3	1	1
022	2	4	4	1	1
023	2	5	4	1	1
024	3	6	5	1	1
025	3	7	6	1	1
026	3	7	7	1	1
027	4	8	8	1	1
028	4	9	9	1	1
029	4	10	10	1	1
030	5	11	11	1	1
031	5	12	11	1	1
032	6	13	12	1	1
033	6	14	13	1	1
034	7	15	14	1	1
035	7	16	15	1	1
036	8	16	16	1	1
037	8	17	17	1	1
038	9	18	17	1	1
039	10	19	18	1	1
040	11	20	19	1	1
041	11	21	20	1	1
042	12	21	21	1	1
043	13	22	22	2	2
044	14	23	22	2	2
045	15	24	23	2	2
046	16	25	24	2	2
047	16	26	25	2	2
048	17	27	26	2	2
049	18	28	27	3	3
050	20	29	28	3	3
051	21	30	29	3	3
052	22	31	30	3	3
053	24	32	31	4	4
054	26	33	32	4	4
055	28	35	33	4	4
056	30	36	34	5	4
057	32	37	36	5	5
058	34	39	37	5	5
059	36	40	38	6	5
060	38	42	40	6	6
061	40	43	41	6	6
062	43	45	43	7	6
063	46	47	44	7	7
064	50	48	46	7	7
065	53	50	47	7	7
066	58	52	49	8	8
067	62	55	51	8	8
068	68	57	53	9	8
069	74	59	56	9	9
070	80	62	58	9	9
071	87	64	60	10	10
072	93	67	63	10	10
073	98	70	65	11	10
074		73	68	11	11
075		77	71	11	11
076		80	74	12	12
077		83	77	12	12
078		87	80	13	13
079		90	84	13	13
080		93	87	14	13
081		96	90	14	14
082		98	94	15	15
083		99	96	15	15
084			98	16	16
085			99	16	16
086				17	17
087				17	17
088				18	18
089				18	18
090				19	18
091				19	19
092				20	19
093				20	20
094				21	20
095				21	21
096				22	22
097				23	22
098				23	23
099				24	23
100				24	24
101				25	24
102				26	25
103				26	26
104				27	26
105				28	27

Table A-8 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS	RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				29	28	133				57	55
107				29	29	134				59	57
108				30	29	135				61	58
109				31	30	136				62	60
110				32	31	137				64	61
111				33	32	138				66	63
112				34	32	139				68	65
113				34	33	140				70	66
114				35	34	141				72	68
115				36	35	142				74	70
116				37	36	143				76	72
117				38	37	144				78	74
118				39	38	145				80	77
119				40	39	146				83	78
120				41	40	147				85	81
121				42	41	148				87	83
122				43	42	149				89	85
123				44	43	150				92	88
124				45	44	151				94	90
125				47	45	152				96	92
126				48	46	153				97	94
127				49	47	154				99	96
128				50	49	155				99	98
129				52	50	156				99	99
130				53	51	157					99
131				54	52	158					99
132				56	54						

Table A-9

LEVEL 2: RAW SCORE TO PERCENTILE RANK, BEGINNING OF GRADE 4 (4.0–4.2)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	1	1	1	1	1
011	1	1	1	1	1
012	1	1	1	1	1
013	2	1	1	1	1
014	2	2	2	1	1
015	3	2	2	1	1
016	5	4	4	1	1
017	7	5	5	1	1
018	9	7	7	1	1
019	13	9	9	1	1
020	16	12	12	1	1
021	20	14	14	1	1
022	24	17	17	1	1
023	28	21	21	1	1
024	33	25	25	1	1
025	37	28	28	1	1
026	42	31	31	1	1
027	47	35	35	1	1
028	51	37	37	1	1
029	55	40	40	1	1
030	58	43	43	2	2
031	62	45	45	2	2
032	64	47	47	2	2
033	67	49	49	3	3
034	70	51	51	3	3
035	73	53	53	4	4
036	75	55	55	5	5
037	78	57	57	6	6
038	80	59	59	7	7
039	82	60	60	8	8
040	84	62	62	10	10
041	86	64	64	11	11
042	88	65	65	13	13
043	90	67	67	15	15
044	91	68	68	17	17
045	92	70	70	20	20
046	94	71	71	22	22
047	95	73	73	24	24
048	95	75	75	26	26
049	96	76	76	28	28
050	97	77	77	30	30
051	97	79	79	32	32
052	98	80	80	34	34
053	98	82	82	36	36
054	99	83	83	38	38
055	99	84	84	40	40
056	99	86	86	42	42
057	99	87	87	43	43
058	99	88	88	45	45
059	99	89	89	46	46
060	99	90	90	48	48
061	99	91	91	49	49
062	99	92	92	51	51
063	99	93	93	52	52
064	99	94	94	53	53
065	99	94	94	54	54
066	99	95	95	56	56
067	99	96	96	57	57
068	99	96	96	58	58
069	99	97	97	59	59
070	99	97	97	61	61
071	99	98	98	62	62
072	99	98	98	63	63
073	99	99	99	64	64
074		99	99	65	65
075		99	99	66	66
076		99	99	68	68
077		99	99	69	69
078		99	99	70	70
079		99	99	71	71
080		99	99	72	72
081		99	99	73	73
082		99	99	74	74
083		99	99	75	75
084		99	99	76	76
085		99	99	77	77
086				78	78
087				79	79
088				80	80
089				81	81
090				81	81
091				82	82
092				83	83
093				84	84
094				85	85
095				86	86
096				87	87
097				88	88
098				89	89
099				89	89
100				90	90
101				91	91
102				91	91
103				92	92
104				92	92
105				93	93

Table A-9 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				93	93
107				94	94
108				94	94
109				95	95
110				95	95
111				96	96
112				96	96
113				96	96
114				97	97
115				97	97
116				97	97
117				98	98
118				98	98
119				98	98
120				98	98
121				98	98
122				99	99
123				99	99
124				99	99
125				99	99
126				99	99
127				99	99
128				99	99
129				99	99
130				99	99
131				99	99
132				99	99

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
133				99	99
134				99	99
135				99	99
136				99	99
137				99	99
138				99	99
139				99	99
140				99	99
141				99	99
142				99	99
143				99	99
144				99	99
145				99	99
146				99	99
147				99	99
148				99	99
149				99	99
150				99	99
151				99	99
152				99	99
153				99	99
154				99	99
155				99	99
156				99	99
157				99	99
158				99	99

Table A-10

LEVEL 2: RAW SCORE TO PERCENTILE, BEGINNING OF GRADE 5 (5.0-5.2)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	1	1	1	1	1
011	1	1	1	1	1
012	1	1	1	1	1
013	1	1	1	1	1
014	1	1	1	1	1
015	1	1	1	1	1
016	1	2	2	1	1
017	2	3	3	1	1
018	3	3	3	1	1
019	4	4	4	1	1
020	5	6	6	1	1
021	6	7	7	1	1
022	8	9	9	1	1
023	10	11	11	1	1
024	13	13	13	1	1
025	15	15	15	1	1
026	18	17	17	1	1
027	20	19	19	1	1
028	23	21	21	1	1
029	25	23	23	1	1
030	28	25	25	1	1
031	30	26	26	1	1
032	33	28	28	1	1
033	35	30	30	1	1
034	38	32	32	1	1
035	41	33	33	1	1
036	43	35	35	2	2
037	46	36	36	2	2
038	48	38	38	2	2
039	51	39	39	3	3
040	53	41	41	4	4
041	56	43	43	4	4
042	58	45	45	5	5
043	61	46	46	6	6
044	63	48	48	7	7
045	65	50	50	7	7
046	68	52	52	9	9
047	70	53	53	10	10
048	72	55	55	11	11
049	74	56	56	12	12
050	77	57	57	13	13
051	78	59	59	14	14
052	80	60	60	15	15
053	83	62	62	16	16
054	85	64	64	17	17
055	87	66	66	18	18
056	89	67	67	20	20
057	90	69	69	21	21
058	92	70	70	22	22
059	93	72	72	23	23
060	95	74	74	24	24
061	96	75	75	25	25
062	97	77	77	26	26
063	97	78	78	27	27
064	98	79	79	28	28
065	99	81	81	29	29
066	99	82	82	30	30
067	99	84	84	31	31
068	99	85	85	32	32
069	99	87	87	33	33
070	99	88	88	35	35
071	99	89	89	36	36
072	99	91	91	37	37
073	99	92	92	38	38
074		94	94	39	39
075		95	95	40	40
076		96	96	41	41
077		97	97	42	42
078		97	97	43	43
079		98	98	44	44
080		99	99	45	45
081		99	99	46	46
082		99	99	47	47
083		99	99	48	48
084		99	99	49	49
085		99	99	50	50
086				51	51
087				53	53
088				54	54
089				55	55
090				56	56
091				57	57
092				58	58
093				59	59
094				60	60
095				61	61
096				62	62
097				63	63
098				64	64
099				65	65
100				67	67
101				67	67
102				68	68
103				69	69
104				70	70
105				72	72

Table A-10 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				73	73
107				74	74
108				75	75
109				76	76
110				77	77
111				78	78
112				79	79
113				80	80
114				81	81
115				82	82
116				82	82
117				83	83
118				84	84
119				85	85
120				86	86
121				87	87
122				88	88
123				88	88
124				89	89
125				90	90
126				91	91
127				91	91
128				92	92
129				93	93
130				94	94
131				94	94
132				95	95

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
133				96	96
134				96	96
135				97	97
136				97	97
137				98	98
138				98	98
139				98	98
140				98	98
141				99	99
142				99	99
143				99	99
144				99	99
145				99	99
146				99	99
147				99	99
148				99	99
149				99	99
150				99	99
151				99	99
152				99	99
153				99	99
154				99	99
155				99	99
156				99	99
157				99	99
158				99	99

Table A-11

LEVEL 2: RAW SCORE TO PERCENTILE RANK, BEGINNING OF GRADE 6 (6.0-6.2)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1		1
010	1	1	1	1	1
011	1	1	1	1	1
012	1	1	1	1	1
013	1	1	1	1	1
014	1	1	1	1	1
015	1	1	1	1	1
016	1	1	1	1	1
017	1	1	1	1	1
018	1	2	2	1	1
019	2	2	2	1	1
020	2	3	3	1	1
021	3	4	4	1	1
022	4	5	5	1	
023	4	6	6	1	1
024	5	7	7	1	1
025	6	8	8	1	1
026	7	9	9	1	1
027	8	10	10	1	1
028	10	11	11	1	1
029	11	12	12	1	1
030	13	13	13	1	1
031	14	15	15	1	1
032	16	16	16	1	1
033	18	17	17	1	1
034	19	18	18	1	1
035	21	20	20	1	1
036	23	21	21	1	1
037	25	22	22	1	1
038	27	23	23	1	1
039	29	24	24	1	
040	31	26	26	1	1
041	33	27	27	2	2
042	35	28	28	2	2
043	38	30	30	2	2
044	40	31	41	3	3
045	42	33	33	3	3
046	45	34	34	3	3
047	47	36	36	4	4
048	50	37	37	4	4
049	53	39	39	5	5
050	55	40	40	5	5
051	58	42	42	6	6
052	61	43	43	6	6
053	64	45	45	7	7
054	66	47	47	7	7
055	69	49	49	8	8
056	72	50	50	8	8
057	75	52	52	9	9
058	77	53	53	10	10
059	80	55	55	10	10
060	83	57	57	11	11
061	85	59	59	11	11
062	88	61	61	12	12
063	90	63	63	13	13
064	92	65	65	13	13
065	94	67	67	14	14
066	96	69	69	15	15
067	97	71	71	16	16
068	98	73	73	16	16
069	99	75	75	17	17
070	99	77	77	18	18
071	99	79	79	19	19
072	99	81	81	20	20
073	99	83	83	20	20
074		85	85	21	21
075		87	87	22	22
076		89	89	23	23
077		91	91	23	23
078		93	93	24	24
079		94	94	25	25
080		96	96	26	26
081		98	98	27	27
082		99	99	28	28
083		99	99	29	29
084		99	99	30	30
085		99	99	31	31
086				32	32
087				33	33
088				34	34
089				35	35
090				36	36
091				37	37
092				38	38
093				39	39
094				40	40
095				41	41
096				42	42
097				43	43
098				44	44
099				45	45
100				46	46
101				47	47
102				48	48
103				49	49
104				51	51
105				52	52

Table A-11 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				53	53
107				54	54
108				55	55
109				57	57
110				58	58
111				59	59
112				60	60
113				61	61
114				63	63
115				64	64
116				65	65
117				66	66
118				68	68
119				69	69
120				70	70
121				71	71
122				73	73
123				74	74
124				75	75
125				77	77
126				78	78
127				79	79
128				80	80
129				81	81
130				82	82
131				83	83
132				85	85

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
133				86	86
134				87	87
135				88	88
136				89	89
137				90	90
138				91	91
139				92	92
140				93	93
141				94	94
142				95	95
143				96	96
144				96	96
145				97	97
146				98	98
147				98	98
148				99	99
149				99	99
150				99	99
151				99	99
152				99	99
153				99	99
154				99	99
155				99	99
156				99	99
157				99	99
158				99	99

Table A-12

LEVEL 3: RAW SCORE TO PERCENTILE RANK, BEGINNING OF GRADE 6 (6.0–6.2)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	1	1	1	1	1
011	1	1	1	1	1
012	2	1	1	1	1
013	3	1	1	1	1
014	4	2	1	1	1
015	6	2	2	1	1
016	8	3	3	1	1
017	11	5	4	1	1
018	15	6	5	1	1
019	19	8	7	1	1
020	23	11	9	1	1
021	28	13	11	1	1
022	33	16	14	1	1
023	38	19	16	1	1
024	44	22	19	1	1
025	49	25	22	1	1
026	53	28	25	1	1
027	57	31	28	1	1
028	61	33	30	1	1
029	65	36	33	1	1
030	68	38	35	2	1
031	71	41	38	2	2
032	74	43	40	3	2
033	77	46	42	4	3
034	80	48	45	4	4
035	82	50	47	5	5
036	84	52	49	6	6
037	86	54	51	8	7
038	88	56	53	9	8
039	89	57	55	11	10
040	90	59	56	13	11
041	92	61	58	14	13
042	93	63	60	16	15
043	93	64	61	18	16
044	94	66	63	20	18
045	96	68	65	22	20
046	96	70	66	24	22
047	96	71	68	26	24
048	96	73	70	28	26
049	97	75	71	30	28
050	97	76	73	32	30
051	98	77	75	34	31
052	98	79	76	35	33
053	98	81	77	37	35
054	98	82	79	39	37
055	99	83	80	41	38
056	99	84	82	42	40
057	99	86	83	44	42
058	99	87	84	45	43
059	99	88	85	47	45
060	99	89	87	48	46
061	99	90	88	50	48
062	99	91	89	51	49
063	99	92	90	53	51
064	99	94	91	54	52
065	99	94	92	56	53
066	99	95	93	57	55
067	99	96	94	59	56
068	99	96	95	60	58
069	99	97	95	61	59
070	99	97	96	63	60
071	99	98	96	64	62
072	99	98	97	65	63
073	99	99	98	67	64
074		99	98	68	66
075		99	98	69	67
076		99	99	70	68
077		99	99	71	69
078		99	99	72	70
079		99	99	73	71
080		99	99	75	72
081		99	99	76	73
082		99	99	77	75
083			99	78	76
084			99	79	77
085			99	80	78
086				81	79
087				82	80
088				82	81
089				83	82
090				84	82
091				85	83
092				86	84
093				87	85
094				88	86
095				88	87
096				89	87
097				90	88
098				90	89
099				91	89
100				91	90
101				92	91
102				93	91
103				93	92
104				94	92
105				94	93

Table A-12 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS	RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				94	93	133				99	99
107				95	94	134				99	99
108				95	94	135				99	99
109				96	95	136				99	99
110				96	95	137				99	99
111				96	95	138				99	99
112				96	96	139				99	99
113				97	96	140				99	99
114				97	96	141				99	99
115				97	96	142				99	99
116				97	97	143				99	99
117				98	97	144				99	99
118				98	97	145				99	99
119				98	98	146				99	99
120				98	98	147				99	99
121				99	98	148				99	99
122				99	98	149				99	99
123				99	98	150				99	99
124				99	99	151				99	99
125				99	99	152				99	99
126				99	99	153				99	99
127				99	99	154				99	99
128				99	99	155				99	99
129				99	99	156					99
130				99	99	157					99
131				99	99	158					99
132				99	99						

Table A-13

LEVEL B. RAW SCORE TO PERCENTILE RANK, ENDING OF GRADE 1 (1.6-1.9)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	2	2	1	1
010	2	3	3	1	1
011	2	4	4	1	1
012	3	5	5	1	1
013	5	7	7	1	1
014	6	9	9	1	1
015	8	10	10	1	1
016	10	12	12	1	1
017	12	14	14	1	1
018	15	16	16	1	1
019	17	18	18	1	1
020	20	19	19	1	1
021	22	21	21	2	2
022	25	23	23	2	2
023	28	25	25	2	2
024	31	27	27	3	3
025	34	30	30	3	3
026	37	32	32	4	4
027	39	34	34	4	4
028	42	36	36	5	5
029	45	38	38	6	6
030	47	41	41	7	7
031	50	44	44	8	8
032	53	47	47	9	9
033	56	50	50	10	10
034	59	54	54	11	11
035	63	57	57	12	12
036	66	61	61	13	13
037	70	65	65	14	14
038	73	70	70	15	15
039	76	75	75	16	16
040	79	80	80	17	17
041	83	86	86	18	18
042	87	92	92	19	19
043	90	98	98	21	21
044	94			22	22
045	97			23	23
046	99			24	24
047				25	25
048				27	27
049				28	28
050				29	29
051				30	30
052				32	32
053				33	33
054				35	35
055				36	36
056				38	38
057				40	40
058				41	41
059				43	43
060				45	45
061				46	46
062				48	48
063				50	50
064				51	51
065				53	53
066				55	55
067				56	56
068				59	59
069				60	60
070				62	62
071				64	64
072				66	66
073				69	69
074				71	71
075				73	73
076				75	75
077				77	77
078				79	79
079				81	81
080				83	83
081				86	86
082				88	88
083				91	91
084				93	93
085				95	95
086				96	96
087				98	98
088				99	99
089				99	99

Table A-14

LEVEL C: RAW SCORE TO PERCENTILE RANK, ENDING OF GRADE 1 (1.6-1.9)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	2	1	1	1	1
007	3	1	1	1	1
008	5	2	2	1	1
009	9	4	3	1	1
010	13	6	5	1	1
011	17	8	8	1	1
012	22	12	11	1	1
013	28	15	14	1	1
014	33	19	18	1	1
015	39	24	22	1	1
016	44	28	26	2	2
017	49	31	30	2	2
018	54	35	34	3	3
019	59	39	37	4	4
020	64	42	40	5	5
021	68	45	43	7	6
022	72	47	46	9	8
023	76	50	49	10	10
024	79	52	51	13	12
025	82	55	53	15	14
026	84	57	55	18	17
027	87	59	57	20	19
028	89	61	59	23	22
029	91	63	61	25	24
030	93	64	63	28	27
031	94	66	65	30	29
032	95	68	67	32	31
033	96	70	68	34	33
034	97	71	70	36	35
035	98	73	71	38	37
036	99	75	73	40	40
037	99	76	75	42	42
038	99	78	76	44	43
039	99	80	78	46	45
040	99	82	80	48	47
041		84	82	50	49
042		86	84	51	50
043		88	86	53	52
044		90	88	55	54
045		92	90	57	55
046		94	92	58	57
047		96	94	60	59
048		97	96	62	61
049		99	97	63	62
050		99	99	65	64
051			99	66	65
052				68	67
053				69	68
054				71	70
055				72	71
056				73	72
057				75	73
058				76	75
059				77	76
060				78	77
061				80	78
062				81	80
063				82	81
064				83	82
065				84	83
066				86	84
067				87	86
068				88	87
069				89	88
070				90	89
071				91	90
072				92	91
073				93	92
074				94	93
075				95	94
076				95	95
077				96	95
078				97	96
079				97	97
080				98	97
081				98	98
082				99	98
083				99	99
084				99	99
085				99	99
086				99	99
087				99	99
088				99	99
089				99	99
090				99	99
091					99

Table A-15

LEVEL C: RAW SCORE TO PERCENTILE RANK, ENDING OF GRADE 2 (2.6-2.9)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	2	1	1	1	1
011	3	2	2	1	1
012	4	2	2	1	1
013	5	3	3	1	1
014	7	4	4	1	1
015	9	5	5	1	1
016	10	6	6	1	1
017	12	7	7	1	1
018	14	8	8	1	1
019	16	9	9	1	1
020	19	10	10	1	1
021	21	12	11	1	1
022	24	13	12	1	1
023	27	14	13	1	1
024	30	15	15	2	2
025	32	16	16	2	2
026	36	18	17	3	2
027	39	19	18	3	3
028	43	20	19	4	3
029	47	21	20	4	4
030	51	22	21	5	4
031	55	24	23	5	5
032	59	25	24	6	5
033	64	27	25	6	6
034	68	28	27	7	7
035	73	29	28	8	7
036	79	31	30	8	8
037	85	33	31	9	8
038	91	35	33	9	9
039	96	38	35	10	10
040	99	40	38	11	11
041		43	40	12	11
042		47	43	12	12
043		51	47	13	13
044		56	51	14	14
045		62	56	15	14
046		68	62	16	15
047		75	68	17	16
048		82	75	18	17
049		90	82	19	18
050		97	90	20	19
051			97	21	20
052				21	21
053				22	22
054				23	23
055				24	24
056				25	25
057				27	26
058				28	27
059				29	28
060				30	29
061				32	31
062				33	32
063				34	33
064				36	34
065				37	36
066				39	38
067				41	39
068				43	41
069				45	43
070				47	45
071				49	47
072				51	49
073				53	51
074				55	53
075				58	56
076				61	58
077				63	61
078				66	63
079				69	66
080				72	69
081				75	72
082				78	75
083				81	78
084				84	81
085				88	84
086				91	88
087				95	92
088				97	95
089				99	97
090				99	99
091					99

Table A-16

LEVEL C: RAW SCORE TO PERCENTILE RANK, ENDING OF GRADE 3 (3.6-3.9)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	1	1	1	1	1
011	1	1	1	1	1
012	1	1	1	1	1
013	1	1	1	1	1
014	1	1	1	1	1
015	2	1	1	1	1
016	2	2	2	1	1
017	3	2	2	1	1
018	3	2	2	1	1
019	4	3	3	1	1
020	5	3	3	1	1
021	5	4	3	1	1
022	6	4	4	1	1
023	7	5	5	1	1
024	8	5	5	1	1
025	10	6	6	1	1
026	11	6	6	1	1
027	13	7	7	1	1
028	14	8	7	1	1
029	16	8	8	1	1
030	19	9	9	1	1
031	22	10	9	1	1
032	25	11	10	1	1
033	29	12	11	1	1
034	34	13	12	1	1
035	40	14	13	2	1
036	48	15	14	2	2
037	59	16	15	2	2
038	73	18	17	2	2
039	87	19	18	2	2
040	97	21	19	2	2
041		23	21	3	3
042		26	23	3	3
043		29	26	3	3
044		33	29	3	3
045		38	33	4	4
046		44	38	4	4
047		52	44	4	4
048		63	53	5	5
049		77	63	5	5
050		92	77	6	5
051			92	6	6
052				6	6
053				7	7
054				7	7
055				8	8
056				9	8
057				9	9
058				10	9
059				10	10
060				11	10
061				12	11
062				12	12
063				13	13
064				14	13
065				15	14
066				16	15
067				17	16
068				18	17
069				19	18
070				20	19
071				22	20
072				23	22
073				25	23
074				26	25
075				28	26
076				30	28
077				32	30
078				35	32
079				37	35
080				41	37
081				44	41
082				49	44
083				53	49
084				59	53
085				65	59
086				72	65
087				80	72
088				88	80
089				95	88
090				99	95
091					99

Table A-17

LEVEL 1: RAW SCORE TO PERCENTILE RANK, ENDING OF GRADE 2 (2.5–2.9)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	1	1	1	1	1
011	1	1	1	1	1
012	1	1	1	1	1
013	2	1	1	1	1
014	3	2	2	1	1
015	4	3	2	1	1
016	5	4	3	1	1
017	8	5	5	1	1
018	9	7	6	1	1
019	12	9	8	1	1
020	14	12	11	1	1
021	16	15	14	1	1
022	18	18	17	1	1
023	20	21	20	1	1
024	23	25	23	1	1
025	25	28	27	1	1
026	28	31	30	1	1
027	30	33	32	1	1
028	32	35	34	1	1
029	35	38	37	1	1
030	37	40	39	1	1
031	40	42	41	2	2
032	43	44	43	2	2
033	46	45	44	3	3
034	48	47	46	4	4
035	51	49	48	5	4
036	53	51	50	6	5
037	56	52	51	7	6
038	58	54	53	8	8
039	61	55	54	9	9
040	63	57	56	11	10
041	66	58	57	12	12
042	68	59	58	13	13
043	70	61	60	15	14
044	72	62	61	16	16
045	75	63	62	18	17
046	77	65	64	19	19
047	79	66	65	20	20
048	80	68	67	22	21
049	82	69	68	23	23
050	84	71	69	25	24
051	85	72	71	26	25
052	87	74	72	27	27
053	88	75	74	29	28
054	89	77	75	30	29
055	90	78	77	31	31
056	91	79	78	33	32
057	92	81	79	34	34
058	93	82	80	35	35
059	94	83	82	36	36
060	95	84	83	38	37
061	95	85	84	39	38
062	96	87	85	40	39
063	97	88	86	41	40
064	97	89	88	42	41
065	98	90	89	43	42
066	98	91	90	44	43
067	99	92	91	45	44
068	99	93	92	46	46
069	99	94	93	47	47
070	99	95	93	49	48
071	99	96	94	50	49
072	99	97	95	51	50
073	99	97	96	52	51
074		98	97	53	52
075		98	98	54	53
076		99	98	55	54
077		99	99	56	55
078		99	99	57	56
079		99	99	58	57
080		99	99	58	58
081		99	99	59	59
082		99	99	60	60
083		99	99	61	61
084			99	62	62
085			99	63	63
086				64	64
087				65	65
088				67	66
089				68	67
090				69	68
091				70	69
092				71	70
093				71	71
094				72	71
095				73	72
096				74	73
097				75	74
098				76	75
099				77	76
100				78	77
101				79	78
102				80	79
103				80	79
104				81	80
105				82	81

Table A-17 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				83	82
107				84	83
108				85	84
109				85	84
110				86	85
111				87	86
112				87	86
113				88	87
114				89	88
115				89	88
116				90	89
117				91	89
118				91	90
119				92	91
120				93	92
121				93	92
122				93	93
123				94	93
124				94	94
125				95	94
126				95	94
127				96	95
128				96	95
129				97	96
130				97	96
131				97	97
132				98	97

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
133				98	97
134				98	98
135				98	98
136				98	98
137				99	98
138				99	98
139				99	99
140				99	99
141				99	99
142				99	99
143				99	99
144				99	99
145				99	99
146				99	99
147				99	99
148				99	99
149				99	99
150				99	99
151				99	99
152				99	99
153				99	99
154				99	99
155				99	99
156				99	99
157					99
158					99

Table A-18

LEVEL 1: RAW SCORE TO PERCENTILE RANK, ENDING OF GRADE 3 (3.6-3.9)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	1	1	1	1	1
011	1	1	1	1	1
012	1	1	1	1	1
013	1	1	1	1	1
014	1	1	1	1	1
015	1	1	1	1	1
016	1	2	1	1	1
017	1	2	2	1	1
018	2	3	3	1	1
019	2	4	3	1	1
020	3	5	4	1	1
021	3	6	6	1	1
022	4	8	7	1	1
023	4	9	9	1	1
024	5	11	10	1	1
025	6	12	12	1	1
026	6	14	13	1	1
027	7	16	15	1	1
028	8	17	17	1	1
029	9	19	18	1	1
030	10	20	20	1	1
031	11	22	21	1	1
032	12	23	22	1	1
033	13	24	23	1	1
034	14	25	25	1	1
035	15	26	26	1	1
036	16	28	27	1	1
037	17	29	28	1	1
038	18	30	30	1	1
039	20	32	31	2	1
040	21	33	32	2	2
041	23	34	33	2	2
042	25	35	34	3	2
043	26	36	36	3	3
044	28	38	37	3	3
045	29	39	38	4	4
046	31	40	39	4	4
047	32	41	40	5	5
048	34	42	41	5	5
049	36	43	43	6	5
050	38	45	44	6	6
051	40	46	45	7	6
052	42	48	47	7	7

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
053	44	49	48	8	8
054	47	51	49	8	8
055	49	52	51	9	9
056	51	54	52	10	9
057	53	55	54	10	10
058	56	57	55	11	11
059	59	59	57	11	11
060	62	60	58	12	12
061	65	62	60	13	12
062	67	64	61	13	13
063	70	66	63	14	14
064	73	68	65	14	14
065	76	70	67	15	15
066	79	72	69	16	16
067	82	74	71	17	16
068	85	76	73	17	17
069	89	78	75	18	18
070	92	80	77	19	19
071	95	82	79	20	19
072	98	84	81	20	20
073	99	86	83	21	21
074		88	85	22	21
075		90	87	22	22
076		92	89	23	23
077		94	90	24	23
078		95	92	25	24
079		97	94	25	25
080		98	96	26	26
081		99	97	27	26
082		99	98	28	27
083		99	99	28	28
084			99	29	29
085			99	30	30
086				31	30
087				32	31
088				32	32
089				33	33
090				34	33
091				35	34
092				36	35
093				36	36
094				37	37
095				38	38
096				39	39
097				40	39
098				41	40
099				42	41
100				43	42
101				43	43
102				44	44
103				45	44
104				46	45
105				47	46

Table A-18 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				48	47
107				48	48
108				49	48
109				50	49
110				52	50
111				53	52
112				54	53
113				55	54
114				56	55
115				57	56
116				58	57
117				59	58
118				60	59
119				62	60
120				63	61
121				64	62
122				65	64
123				66	65
124				67	66
125				69	67
126				70	68
127				71	69
128				73	71
129				74	72
130				75	73
131				76	74
132				77	76
133				79	77
134				80	78
135				81	79
136				82	80
137				83	81
138				84	83
139				86	84
140				87	85
141				88	86
142				90	87
143				91	89
144				92	90
145				93	91
146				94	92
147				95	93
148				96	94
149				97	95
150				98	96
151				98	97
152				99	98
153				99	99
154				99	99
155				99	99
156				99	99
157					99
158					99

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Table A-19

LEVEL 1: RAW SCORE TO PERCENTILE RANK, ENDING OF GRADE 4 (4.6–4.9)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	1	1	1	1	1
011	1	1	1	1	1
012	1	1	1	1	1
013	1	1	1	1	1
014	1	1	1	1	1
015	1	1	1	1	1
016	1	1	1	1	1
017	1	1	1	1	1
018	1	1	1	1	1
019	1	1	1	1	1
020	1	2	2	1	1
021	1	3	2	1	1
022	1	3	3	1	1
023	2	4	4	1	1
024	2	5	4	1	1
025	2	6	5	1	1
026	2	6	6	1	1
027	3	7	7	1	1
028	3	8	8	1	1
029	3	9	9	1	1
030	4	10	9	1	1
031	4	11	10	1	1
032	5	11	11	1	1
033	5	12	12	1	1
034	6	13	13	1	1
035	6	14	13	1	1
036	7	15	14	1	1
037	7	16	15	1	1
038	8	17	16	1	1
039	8	18	17	1	1
040	9	19	18	1	1
041	10	20	19	1	1
042	10	21	20	1	1
043	11	22	21	1	1
044	12	23	22	1	1
045	12	24	23	1	1
046	13	25	24	1	1
047	14	26	25	2	2
048	15	27	26	2	2
049	16	28	27	2	2
050	17	29	28	2	2
051	19	30	29	2	2
052	20	31	30	3	3
053	21	33	31	3	3
054	23	34	32	3	3
055	25	35	34	3	3
056	26	37	35	4	3
057	28	38	36	4	4
058	31	39	38	4	4
059	33	41	39	4	4
060	36	42	41	5	5
061	38	44	42	5	5
062	41	46	43	5	5
063	44	47	45	5	5
064	47	49	47	6	5
065	51	51	48	6	6
066	56	53	50	6	6
067	61	56	52	6	6
068	66	58	54	7	7
069	72	60	57	7	7
070	78	62	59	8	7
071	86	65	61	8	8
072	92	68	63	8	8
073	98	71	66	9	8
074		74	69	9	9
075		76	72	10	9
076		79	74	10	10
077		83	77	10	10
078		87	80	11	11
079		90	84	11	11
080		93	87	12	12
081		96	91	12	12
082		98	94	13	13
083		99	96	13	13
084			98	14	14
085			99	14	14
086				15	15
087				16	15
088				16	16
089				17	16
090				17	17
091				18	17
092				18	18
093				19	18
094				20	19
095				20	20
096				21	21
097				22	21
098				22	22
099				23	22
100				24	23
101				24	24
102				25	24
103				26	25
104				27	26
105				27	27

Table A-19 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				28	27
107				29	28
108				30	29
109				30	30
110				31	30
111				32	31
112				33	32
113				34	33
114				34	34
115				35	34
116				36	35
117				37	36
118				38	37
119				39	38
120				40	39
121				41	40
122				43	41
123				44	42
124				45	43
125				46	44
126				48	46
127				49	47
128				51	48
129				52	50
130				53	51
131				54	52
132				56	54
133				57	55
134				59	56
135				60	58
136				62	59
137				63	61
138				65	62
139				67	64
140				69	66
141				71	68
142				73	70
143				75	72
144				78	74
145				80	76
146				82	78
147				84	80
148				86	83
149				89	85
150				91	87
151				93	89
152				95	91
153				97	93
154				98	95
155				99	97
156				99	98
157					99
158					99

Table A-20

LEVEL 1: RAW SCORE TO PERCENTILE RANK, ENDING OF GRADE 5 (5.6-5.9)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	1	1	1	1	1
011	1	1	1	1	1
012	1	1	1	1	1
013	1	1	1	1	1
014	1	1	1	1	1
015	1	1	1	1	1
016	1	1	1	1	1
017	1	1	1	1	1
018	1	1	1	1	1
019	1	1	1	1	1
020	1	1	1	1	1
021	1	1	1	1	1
022	1	2	2	1	1
023	1	2	2	1	1
024	1	3	3	1	1
025	1	3	3	1	1
026	1	4	4	1	1
027	1	4	4	1	1
028	1	5	4	1	1
029	2	5	5	1	1
030	2	5	5	1	1
031	2	6	6	1	1
032	2	6	6	1	1
033	2	7	7	1	1
034	3	8	7	1	1
035	3	8	8	1	1
036	3	9	9	1	1
037	3	10	9	1	1
038	4	10	10	1	1
039	4	11	11	1	1
040	4	11	11	1	1
041	5	12	12	1	1
042	5	13	12	1	1
043	5	13	13	1	1
044	6	14	14	1	1
045	6	15	14	1	1
046	7	16	15	1	1
047	7	16	16	1	1
048	8	17	16	1	1
049	9	18	17	1	1
050	9	19	18	1	1
051	10	20	19	1	1
052	11	20	19	1	1

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
053	11	21	20	1	1
054	12	22	21	1	1
055	14	23	22	2	1
056	15	24	23	2	2
057	16	25	24	2	2
058	17	26	25	2	2
059	19	27	26	2	2
060	20	28	27	2	2
061	22	29	28	2	2
062	25	31	29	2	2
063	27	32	30	2	2
064	30	34	31	2	2
065	34	36	33	3	3
066	38	37	35	3	3
067	43	39	36	3	3
068	49	41	38	3	3
069	57	43	40	3	3
070	66	46	42	3	3
071	76	48	44	4	3
072	86	51	46	4	4
073	96	54	49	4	4
074		58	52	4	4
075		62	55	5	4
076		66	59	5	5
077		70	63	5	5
078		75	67	5	5
079		80	71	6	5
080		86	76	6	6
081		91	81	6	6
082		96	86	6	6
083		99	92	7	7
084			96	7	7
085			99	7	7
086				8	8
087				8	8
088				9	8
089				9	9
090				9	9
091				10	10
092				10	10
093				10	10
094				11	11
095				11	11
096				12	12
097				12	12
098				13	12
099				13	13
100				14	13
101				14	14
102				15	14
103				15	15
104				16	15
105				17	16

Table A-20 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				17	17
107				18	17
108				18	18
109				19	18
110				19	19
111				20	19
112				20	20
113				21	20
114				22	21
115				22	21
116				23	22
117				23	23
118				24	23
119				25	24
120				26	25
121				26	25
122				27	26
123				28	27
124				29	28
125				30	29
126				31	30
127				32	31
128				33	32
129				34	33
130				36	34
131				37	35
132				38	36
133				39	38
134				41	39
135				42	40
136				44	41
137				46	43
138				48	45
139				50	47
140				52	48
141				54	50
142				57	52
143				59	55
144				62	57
145				65	60
146				68	63
147				71	66
148				75	69
149				78	72
150				82	75
151				86	79
152				89	82
153				93	86
154				96	90
155				99	93
156				99	97
157					99
158					99

Table A-21

LEVEL 2: RAW SCORE TO PERCENTILE RANK, ENDING OF GRADE 4 (4.6–4.9)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	1	1	1	1	1
011	1	1	1	1	1
012	1	1	1	1	1
013	1	1	1	1	1
014	1	1	1	1	1
015	1	1	1	1	1
016	1	1	1	1	1
017	2	2	2	1	1
018	3	3	3	1	1
019	4	4	4	1	1
020	5	5	5	1	1
021	7	7	7	1	1
022	8	9	9	1	1
023	10	10	10	1	1
024	12	12	12	1	1
025	14	14	14	1	1
026	16	17	17	1	1
027	19	19	19	1	1
028	21	21	21	1	1
029	23	23	23	1	1
030	25	25	25	1	1
031	28	27	27	1	1
032	30	29	29	1	1
033	33	31	31	1	1
034	35	32	32	1	1
035	37	34	34	1	1
036	40	36	36	1	1
037	42	38	38	1	2
038	45	40	40	2	2
039	47	41	41	3	3
040	50	43	43	3	3
041	52	45	45	4	4
042	54	47	47	5	5
043	57	48	48	5	5
044	60	50	50	6	6
045	62	51	51	7	7
046	64	53	53	8	8
047	67	54	54	9	9
048	69	56	56	10	10
049	71	57	57	11	11
050	74	59	59	12	12
051	76	61	61	13	13
052	78	62	62	14	14
053	80	64	64	15	15
054	82	66	66	17	17
055	84	68	68	18	18
056	86	69	69	19	19
057	88	71	71	20	20
058	90	73	73	21	21
059	91	75	75	22	22
060	93	77	77	23	23
061	94	78	78	25	25
062	96	80	80	26	26
063	97	81	81	27	27
064	98	82	82	28	28
065	98	84	84	29	29
066	99	85	85	30	30
067	99	86	86	31	31
068	99	88	88	32	32
069	99	89	89	33	33
070	99	90	90	34	34
071	99	92	92	35	35
072	99	93	93	36	36
073	99	94	94	37	37
074		95	95	38	38
075		96	96	39	39
076		96	96	40	40
077		97	97	42	42
078		98	98	43	43
079		99	99	44	44
080		99	99	45	45
081		99	99	46	46
082		99	99	47	47
083		99	99	48	48
084		99	99	49	49
085		99	99	50	50
086				51	51
087				52	52
088				53	53
089				54	54
090				55	55
091				56	56
092				57	57
093				59	59
094				60	60
095				61	61
096				62	62
097				63	63
098				65	65
099				66	66
100				67	67
101				68	68
102				69	69
103				70	70
104				71	71
105				72	72

Table A-21 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS	RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				73	73	133				95	95
107				74	74	134				96	96
108				75	75	135				96	96
109				76	76	136				97	97
110				77	77	137				97	97
111				78	78	138				98	98
112				79	79	139				98	98
113				80	80	140				98	98
114				81	81	141				99	99
115				82	82	142				99	99
116				83	83	143				99	99
117				84	84	144				99	99
118				85	85	145				99	99
119				86	86	146				99	99
120				86	86	147				99	99
121				87	87	148				99	99
122				88	88	149				99	99
123				89	89	150				99	99
124				89	89	151				99	99
125				90	90	152				99	99
126				91	91	153				99	99
127				91	91	154				99	99
128				92	92	155				99	99
129				93	93	156				99	99
130				93	93	157				99	99
131				94	94	158				99	99
132				95	95						

Table A-22

LEVEL 2: RAW SCORE TO PERCENTILE RANK, ENDING OF GRADE 5 (5.6-5.9)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	1	1	1	1	1
011	1	1	1	1	1
012	1	1	1	1	1
013	1	1	1	1	1
014	1	1	1	1	1
015	1	1	1	1	1
016	1	1	1	1	1
017	1	1	1	1	1
018	1	2	2	1	1
019	1	2	2	1	1
020	2	3	3	1	1
021	2	4	4	1	1
022	3	5	5	1	1
023	4	6	6	1	1
024	5	7	7	1	1
025	6	8	8	1	1
026	7	9	9	1	1
027	8	11	11	1	1
028	10	12	12	1	1
029	11	13	13	1	1
030	12	14	14	1	1
031	14	16	16	1	1
032	15	17	17	1	1
033	17	18	18	1	1
034	19	19	19	1	1
035	20	20	20	1	1
036	22	22	22	1	1
037	24	23	23	1	1
038	26	25	25	1	1
039	27	26	26	1	1
040	29	27	27	1	1
041	31	28	28	1	1
042	33	29	29	2	2
043	35	31	31	2	2
044	37	32	32	2	2
045	39	34	34	3	3
046	41	35	35	3	3
047	43	36	36	4	4
048	45	37	37	4	4
049	48	39	39	5	5
050	50	40	40	5	5
051	52	42	42	6	6
052	55	44	44	6	6
053	58	45	45	7	7
054	61	47	47	8	8
055	64	49	49	8	8
056	67	51	51	9	9
057	69	53	53	9	9
058	72	54	54	10	10
059	75	56	56	11	11
060	78	58	58	11	11
061	80	60	60	12	12
062	84	62	62	13	13
063	87	64	64	13	13
064	90	65	65	14	14
065	92	68	68	15	15
066	94	70	70	15	15
067	96	72	72	16	16
068	97	73	73	17	17
069	98	75	75	18	18
070	99	77	77	18	18
071	99	79	79	19	19
072	99	81	81	20	20
073	99	83	83	21	21
074		85	85	22	22
075		87	87	22	22
076		89	89	23	23
077		91	91	24	24
078		93	93	25	25
079		95	95	26	26
080		96	96	26	26
081		98	98	27	27
082		99	99	28	28
083		99	99	29	29
084		99	99	29	29
085		99	99	30	30
086				31	31
087				32	32
088				33	33
089				34	34
090				35	35
091				36	36
092				37	37
093				38	38
094				39	39
095				40	40
096				41	41
097				42	42
098				43	43
099				44	44
100				45	45
101				46	46
102				47	47
103				48	48
104				49	49
105				50	50

Table A-22 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				51	51
107				52	52
108				53	53
109				54	54
110				56	56
111				57	57
112				58	58
113				59	59
114				61	61
115				62	62
116				63	63
117				64	64
118				66	66
119				67	67
120				68	68
121				69	69
122				70	70
123				71	71
124				72	72
125				74	74
126				75	75
127				76	76
128				78	78
129				79	79
130				80	80
131				81	81
132				82	82
133				83	83
134				85	85
135				86	86
136				87	87
137				88	88
138				89	89
139				91	91
140				92	92
141				93	93
142				94	94
143				95	95
144				95	95
145				96	96
146				97	97
147				98	98
148				98	98
149				99	99
150				99	99
151				99	99
152				99	99
153				99	99
154				99	99
155				99	99
156				99	99
157				99	99
158				99	99

Table A-23

LEVEL 2: RAW SCORE TO PERCENTILE RANK, ENDING OF GRADE 6 (6.6-6.9)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	1	1	1	1	1
011	1	1	1	1	1
012	1	1	1	1	1
013	1	1	1	1	1
014	1	1	1	1	1
015	1	1	1	1	1
016	1	1	1	1	1
017	1	1	1	1	1
018	1	1	1	1	1
019	1	1	1	1	1
020	1	2	2	1	1
021	1	2	2	1	1
022	1	2	2	1	1
023	2	3	3	1	1
024	2	4	4	1	1
025	2	4	4	1	1
026	3	5	5	1	1
027	3	6	6	1	1
028	4	6	6	1	1
029	5	7	7	1	1
030	6	8	8	1	1
031	6	8	8	1	1
032	7	9	9	1	1
033	8	10	10	1	1
034	9	11	11	1	1
035	10	11	11	1	1
036	11	12	12	1	1
037	12	13	13	1	1
038	13	14	14	1	1
039	14	15	15	1	1
040	16	16	16	1	1
041	17	17	17	1	1
042	19	18	18	1	1
043	20	19	19	1	1
044	22	20	20	1	1
045	24	21	21	1	1
046	25	22	22	1	1
047	27	24	24	1	1
048	29	25	25	2	2
049	32	26	26	2	2
050	34	27	27	2	2
051	36	29	29	2	2
052	38	30	30	2	2
053	40	31	31	3	3
054	43	33	33	3	3
055	46	34	34	3	3
056	49	36	36	4	4
057	52	37	37	4	4
058	55	39	39	4	4
059	58	41	41	5	5
060	61	42	42	5	5
061	65	44	44	5	5
062	68	46	46	6	6
063	72	48	48	6	6
064	76	50	50	6	6
065	80	52	52	7	7
066	83	54	54	7	7
067	86	56	56	7	7
068	90	58	58	8	8
069	93	61	61	8	8
070	96	63	63	9	9
071	98	66	66	9	9
072	99	68	68	10	10
073	99	71	71	10	10
074		73	73	11	11
075		76	76	11	11
076		79	79	12	12
077		82	82	12	12
078		85	85	13	13
079		88	88	14	14
080		90	90	14	14
081		93	93	15	15
082		96	96	16	16
083		98	98	16	16
084		99	99	17	17
085		99	99	17	17
086				18	18
087				19	19
088				20	20
089				20	20
090				21	21
091				22	22
092				23	23
093				24	24
094				24	24
095				25	25
096				26	26
097				27	27
098				28	28
099				28	28
100				29	29
101				30	30
102				31	31
103				32	32
104				33	33
105				34	34

Table A-23 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				35	35
107				36	36
108				37	37
109				38	38
110				39	39
111				40	40
112				42	42
113				43	43
114				44	44
115				45	45
116				46	46
117				47	47
118				48	48
119				49	49
120				51	51
121				52	52
122				53	53
123				55	55
124				56	56
125				57	57
126				58	58
127				60	60
128				61	61
129				63	63
130				64	64
131				66	66
132				67	67

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
133				69	69
134				71	71
135				72	72
136				74	74
137				76	76
138				77	77
139				79	79
140				80	80
141				82	82
142				84	84
143				85	85
144				87	87
145				88	88
146				90	90
147				91	91
148				93	93
149				94	94
150				95	95
151				96	96
152				98	98
153				98	98
154				99	99
155				99	99
156				99	99
157				99	99
158				99	99

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Table A-24

LEVEL 3: RAW SCORE TO PERCENTILE RANK, ENDING OF GRADE 6 (6.6-6.9)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	1	1	1	1	1
001	1	1	1	1	1
002	1	1	1	1	1
003	1	1	1	1	1
004	1	1	1	1	1
005	1	1	1	1	1
006	1	1	1	1	1
007	1	1	1	1	1
008	1	1	1	1	1
009	1	1	1	1	1
010	1	1	1	1	1
011	1	1	1	1	1
012	1	1	1	1	1
013	1	1	1	1	1
014	1	1	1	1	1
015	2	1	1	1	1
016	3	2	1	1	1
017	4	2	2	1	1
018	6	3	3	1	1
019	8	4	4	1	1
020	10	6	5	1	1
021	12	8	6	1	1
022	[illegible]	9	8	1	1
023	18	11	10	1	1
024	21	13	12	1	1
025	24	15	13	1	1
026	27	17	15	1	1
027	30	19	17	1	1
028	33	21	19	1	1
029	36	23	21	1	1
030	39	25	23	1	1
031	42	27	25	1	1
032	44	29	27	1	1
033	47	31	28	1	1
034	49	33	30	1	1
035	51	35	32	2	2
036	54	36	34	2	2
037	56	38	36	3	3
038	58	40	37	4	3
039	60	42	39	4	4
040	62	44	41	5	5
041	64	46	43	6	6
042	66	48	45	7	6
043	68	49	46	8	7
044	70	51	48	9	8
045	72	53	50	10	9
046	73	54	51	11	10
047	75	56	53	12	11
048	77	58	55	14	12
049	78	60	56	15	14
050	80	61	58	16	15
051	81	63	60	17	16
052	83	64	61	19	17
053	84	66	63	20	19
054	85	68	64	21	20
055	86	69	66	22	21
056	87	71	67	24	22
057	88	73	69	25	23
058	89	74	71	26	24
059	90	76	72	27	25
060	91	78	74	28	27
061	92	79	76	30	28
062	93	81	77	31	29
063	94	82	79	32	31
064	95	84	80	34	32
065	96	86	82	35	33
066	96	87	83	36	34
067	97	88	85	37	35
068	98	90	86	39	37
069	99	91	88	40	38
070	99	92	89	41	39
071	99	94	90	42	40
072	99	95	92	43	41
073	99	96	93	44	43
074		97	94	45	44
075		98	95	46	45
076		98	96	47	46
077		99	97	49	47
078		99	98	50	48
079		99	98	50	49
080		99	99	51	50
081		99	99	53	51
082		99	99	54	52
083			99	55	53
084			99	56	54
085				57	55
086				58	56
087				59	57
088				60	58
089				61	59
090				62	60
091				63	61
092				64	62
093				65	63
094				66	64
095				67	65
096				68	66
097				69	67
098				70	68
099				71	69
100				72	70
101				73	71
102				74	72
103				75	73
104				75	73
105				76	74

Table A-24 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
10[illegible]				77	75
10[illegible]				78	76
10[illegible]				79	77
109				80	78
110				81	79
111				82	80
112				82	81
113				83	81
114				84	82
115				84	83
116				85	83
117				86	84
118				87	85
119				87	85
120				88	86
121				88	87
122				89	88
123				90	88
124				90	89
125				91	89
126				92	90
127				92	91
128				93	91
129				93	92
130				94	92
131				94	93
132				95	94

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
133				95	94
134				96	95
135				96	95
136				97	96
137				97	96
138				97	96
139				97	97
140				98	97
141				98	97
142				99	98
143				99	98
144				99	98
145				99	99
146				99	99
147				99	99
148				99	99
149				99	99
150				99	99
151				99	99
152				99	99
153				99	99
154				99	99
155				99	99
156					99
157					99
158					99

Table A-25

Raw Score to Vertical Scale Score Conversion: Level A

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	187	201	201	146	147
001	197	213	212	153	153
002	207	224	222	159	160
003	216	232	231	165	166
004	225	240	239	171	171
005	234	247	245	176	176
006	243	253	251	181	181
007	252	258	256	186	186
008	261	262	261	190	190
009	269	267	265	195	195
010	277	270	269	199	199
011	285	274	273	203	203
012	292	277	276	207	206
013	299	281	279	210	210
014	307	284	283	214	214
015	313	287	286	217	217
016	320	290	289	221	220
017	327	293	292	224	224
018	334	297	295	227	227
019	341	300	298	230	230
020	348	303	301	233	233
021	357	306	303	237	236
022	366	309	306	240	239
023	376	312	309	242	242
024	388	315	312	245	245
025	402	317	314	248	248
026	418	320	317	251	250
027		323	319	254	253
028		325	322	257	256
029		327	324	259	258
030		330	326	262	261
031		332	328	265	264
032		333	330	267	266
033		335	332	270	268
034		337	334	272	271
035		339	335	274	273
036		341	337	277	275
037		343	339	279	277
038		346	341	281	279
039		349	343	283	282
040		352	346	285	283
041		356	349	287	285
042		361	352	289	287
043		367	356	291	289
044		347	361	293	291
045		383	368	294	292
046		394	375	296	294
047		407	384	298	296
048			394	299	297
049			407	301	299
050				303	300
051				304	302
052				306	303
053				308	305
054				310	307
055				312	308
056				314	310
057				316	312
058				318	314
059				321	316
060				324	319
061				327	322
062				331	325
063				335	328
064				340	332
065				345	336
066				356	340
067				357	345
068				363	351
069				371	357
070				380	364
071				389	372
072				400	380
073				411	389
074					400
075					411

Table A-26

Raw Score to Vertical Scale Score Conversion: Level B

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	194	226	225	159	159
001	211	240	239	168	168
002	225	254	253	176	176
003	238	266	265	184	184
004	250	277	276	191	192
005	260	286	286	199	199
006	270	296	295	206	206
007	278	304	303	212	212
008	286	312	311	219	219
009	294	319	319	225	225
010	301	326	326	231	231
011	308	333	332	236	237
012	314	339	338	242	242
013	320	345	344	247	247
014	326	350	350	252	252
015	331	356	355	257	257
016	336	361	360	262	262
017	342	366	365	267	267
018	347	370	370	271	271
019	352	374	374	276	276
020	356	378	378	280	280
021	361	382	382	284	284
022	366	386	385	288	288
023	370	389	389	292	292
024	374	392	392	296	296
025	378	395	394	300	300
026	382	397	397	304	304
027	385	400	399	307	307
028	389	402	401	311	311
029	392	404	404	314	314
030	395	406	406	318	318
031	398	408	408	321	321
032	401	410	410	324	324
033	404	413	412	327	327
034	407	415	415	331	331
035	410	419	419	334	334
036	414	423	423	336	336
037	417	428	428	339	339
038	421	434	434	342	342
039	426	441	441	345	345
040	432	450	450	347	347
041	438	461	461	350	350
042	445	474	474	353	353
043	454	490	490	355	355
044	465			357	357
045	477			360	360
046	492			362	362
047				364	364
048				366	366
049				368	368
050				370	370
051				372	372
052				374	374
053				376	376
054				377	377
055				379	379
056				381	381
057				382	382
058				384	384
059				385	386
060				387	387
061				389	389
062				390	390
063				392	392
064				394	394
065				395	395
066				397	397
067				399	399
068				401	401
069				403	403
070				405	405
071				408	408
072				410	410
073				413	413
074				416	416
075				419	419
076				423	423
077				426	427
078				431	431
079				435	435
080				440	440
081				445	445
082				451	451
083				457	457
084				464	464
085				471	471
086				479	480
087				488	488
088				497	498
089				508	508

Table A-27

Raw Score to Vertical Scale Score Conversion: Level C

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	223	235	230	167	163
001	239	247	243	176	172
002	255	259	255	185	181
003	269	270	267	193	190
004	282	281	278	201	199
005	294	291	288	210	208
006	305	301	298	218	216
007	316	311	308	225	224
008	326	320	317	233	232
009	335	329	326	241	240
010	344	337	335	248	247
011	352	345	343	255	254
012	360	353	351	262	261
013	368	360	358	269	268
014	375	367	365	275	274
015	382	374	371	281	281
016	388	380	377	288	287
017	394	386	383	294	293
018	400	391	388	300	299
019	405	396	393	305	305
020	411	400	398	311	310
021	416	405	402	316	315
022	420	408	406	321	321
023	425	412	410	327	326
024	429	415	413	331	330
025	433	418	416	336	335
026	437	421	419	341	340
027	441	423	421	345	344
028	446	425	424	350	348
029	450	427	426	354	352
030	455	429	427	358	356
031	460	431	429	362	360
032	466	432	431	365	364
033	472	434	432	369	367
034	480	436	434	372	371
035	488	437	436	376	374
036	498	439	438	379	377
037	510	442	440	382	380
038	523	445	442	385	383
039	539	448	445	387	386
040	557	451	448	390	389
041		456	452	393	391
042		461	456	395	394
043		467	461	398	396
044		475	467	400	398
045		483	475	402	401
046		493	483	404	403
047		504	493	406	405
048		517	504	408	407
049		532	517	410	409
050		548	532	412	410
051			549	413	412
052				415	414
053				417	415
054				418	417
055				420	419
056				421	420
057				423	422
058				425	423
059				426	425
060				428	427
061				430	428
062				431	430
063				433	432
064				435	434
065				437	436
066				439	438
067				442	440
068				444	442
069				447	444
070				449	447
071				452	450
072				456	453
073				459	456
074				463	459
075				467	463
076				471	467
077				476	471
078				481	476
079				486	481
080				492	486
081				498	492
082				504	498
083				512	504
084				519	511
085				527	519
086				536	527
087				545	536
088				555	545
089				566	555
090				577	566
091					577

Table A-28

Raw Score to Vertical Scale Score Conversion: Level 1

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	253	255	252	203	204
001	263	264	262	209	209
002	272	273	271	215	215
003	281	281	280	221	221
004	290	290	289	226	226
005	298	298	297	232	232
006	306	306	305	237	237
007	313	314	313	243	242
008	321	322	321	248	247
009	328	329	328	253	253
010	335	336	336	259	258
011	342	344	343	264	263
012	348	351	350	269	268
013	355	358	357	274	273
014	361	364	363	279	277
015	367	371	370	284	282
016	372	377	376	288	287
017	378	383	382	293	292
018	384	390	388	298	296
019	389	395	394	302	301
020	394	401	399	307	305
021	399	407	405	311	310
022	404	412	410	316	314
023	409	417	415	320	318
024	413	422	420	324	323
025	418	427	425	328	327
026	422	432	430	332	331
027	427	436	434	336	335
028	431	440	438	340	339
029	435	444	442	344	343
030	439	448	446	348	347
031	442	452	450	352	351
032	446	456	454	356	354
033	449	459	457	359	358
034	453	463	460	363	362
035	456	466	464	367	365
036	459	469	467	370	369
037	462	471	469	374	373
038	465	474	472	377	376
039	468	477	475	380	379
040	471	479	477	384	383
041	473	481	480	387	386
042	476	483	482	390	389
043	479	485	484	393	392
044	481	487	486	396	395
045	484	489	488	399	399
046	486	491	490	402	402
047	488	493	491	405	405
048	491	494	493	408	407
049	493	496	494	411	410
050	496	497	496	414	413
051	498	499	498	417	416
052	501	500	499	419	418

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
053	504	502	500	422	421
054	506	503	502	424	424
055	510	505	503	427	426
056	513	506	505	429	429
057	516	508	506	432	431
058	520	510	508	434	434
059	524	512	510	436	436
060	529	514	512	439	438
061	533	516	513	441	440
062	539	518	516	443	443
063	544	521	518	445	445
064	551	524	520	447	447
065	558	527	523	449	449
066	565	531	526	451	451
067	573	534	529	453	453
068	582	539	532	455	455
069	592	543	536	457	456
070	603	548	541	459	458
071	615	554	545	460	460
072	628	560	550	462	462
073	642	566	556	464	463
074		573	562	466	465
075		581	568	467	467
076		590	575	469	468
077		599	583	470	470
078		609	591	472	471
079		619	601	473	473
080		631	610	475	474
081		644	621	476	475
082		657	633	477	477
083		671	645	479	478
084			658	480	479
085			673	481	481
086				482	482
087				484	483
088				485	484
089				486	485
090				487	486
091				488	487
092				489	489
093				490	490
094				491	491
095				492	492
096				494	493
097				495	494
098				496	495
099				497	496
100				498	497
101				499	498
102				500	499
103				501	500
104				502	501
105				503	502

Table A-28 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				504	503
107				505	504
108				506	505
109				508	506
110				509	507
111				510	509
112				511	510
113				513	511
114				514	512
115				515	514
116				517	515
117				518	516
118				520	518
119				522	519
120				523	521
121				525	523
122				527	524
123				529	526
124				531	528
125				533	530
126				535	532
127				538	534
128				540	536
129				543	539
130				545	541
131				548	544
132				551	547
133				554	549
134				557	552
135				561	555
136				564	559
137				568	562
138				572	565
139				576	569
140				580	573
141				585	577
142				589	581
143				594	586
144				599	590
145				604	595
146				610	600
147				616	605
148				622	610
149				628	616
150				634	622
151				641	628
152				648	634
153				656	641
154				663	648
155				671	655
156				679	663
157					670
158					678

Table A-29

Raw Score to Vertical Scale Score Conversion: Level 2

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	285	277	277	258	261
001	293	285	285	262	265
002	302	293	292	266	269
003	310	300	300	270	272
004	318	308	308	274	276
005	326	316	316	278	280
006	334	324	324	282	284
007	342	332	332	286	288
008	350	340	340	290	292
009	358	348	348	294	296
010	366	355	355	298	300
011	373	363	363	302	304
012	381	371	370	306	308
013	388	378	378	311	313
014	396	385	385	315	317
015	403	393	393	319	321
016	411	400	400	323	325
017	418	407	407	328	329
018	425	413	413	332	334
019	433	420	420	336	338
020	440	427	427	341	342
021	447	433	433	345	346
022	454	439	439	349	351
023	460	445	445	353	355
024	467	451	451	358	359
025	474	457	457	362	363
026	480	462	463	366	368
027	487	468	468	370	372
028	493	473	473	375	376
029	499	478	478	379	380
030	505	483	483	383	384
031	511	487	488	387	388
032	516	492	492	391	392
033	522	496	496	395	396
034	527	500	500	399	400
035	532	504	504	403	404
036	537	508	508	407	408
037	542	511	512	411	412
038	547	515	515	415	416
039	551	518	518	419	420
040	556	521	522	423	424
041	560	524	524	427	428
042	564	527	527	431	432
043	568	530	530	434	435
044	572	532	533	438	439
045	576	535	535	442	443
046	580	537	538	445	446
047	583	540	540	449	450
048	587	542	542	452	453
049	591	544	544	456	457
050	595	546	546	459	460
051	599	548	549	463	463
052	603	550	551	466	467
053	607	553	553	469	470
054	612	555	555	473	473
055	616	557	557	476	476
056	622	559	559	479	479
057	627	561	561	482	482
058	633	563	564	485	485
059	640	566	566	488	488
060	647	568	569	491	491
061	654	571	571	494	494
062	663	574	574	496	497
063	672	577	577	499	499
064	683	580	581	502	502
065	694	584	584	504	505
066	706	588	588	507	507
067	720	592	592	510	510
068	735	596	597	512	512
069	752	601	601	514	514
070	770	606	607	517	517
071	789	612	612	519	519
072	811	618	618	521	521
073	834	625	625	524	523
074		632	632	526	526
075		639	640	528	528
076		647	648	530	530
077		656	657	532	532
078		666	666	534	534
079		676	676	536	536
080		687	687	538	537
081		699	699	540	539
082		711	712	541	541
083		724	725	543	543
084		739	739	545	544
085		754	754	547	546
086				548	548
087				550	549
088				551	551
089				553	553
090				555	554
091				556	556
092				558	557
093				559	559
094				561	560
095				562	562
096				564	563
097				565	564
098				567	566
099				568	567
100				569	569
101				571	570
102				572	572
103				574	573
104				575	575
105				577	576

Table A-29 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				578	578
107				580	579
108				582	581
109				583	583
110				585	584
111				587	586
112				588	588
113				590	589
114				592	591
115				594	593
116				596	595
117				598	597
118				600	600
119				603	602
120				605	604
121				607	606
122				610	609
123				613	612
124				615	614
125				618	617
126				621	620
127				624	623
128				627	626
129				631	630
130				634	633
131				638	637
132				642	641
133				646	645
134				650	649
135				654	653
136				659	657
137				664	662
138				669	667
139				674	672
140				679	677
141				685	683
142				691	689
143				697	694
144				703	701
145				709	707
146				716	714
147				723	721
148				731	728
149				738	736
150				746	743
151				755	751
152				763	760
153				772	769
154				781	778
155				791	787
156				801	797
157				811	807
158				822	817

Table A-30

Raw Score to Vertical Scale Score Conversion: Level 3

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
000	307	30[illegible]	308	291	295
001	318	314	314	294	298
002	330	321	321	298	302
003	342	329	329	301	306
004	354	336	336	305	309
005	366	345	344	309	313
006	377	353	352	314	317
007	389	361	360	318	321
008	400	370	368	323	326
009	411	378	377	327	330
010	422	387	385	332	335
011	433	396	393	337	339
012	444	404	401	341	344
013	455	413	410	346	349
014	466	421	418	351	353
015	476	430	426	357	358
016	487	438	434	362	363
017	497	446	442	367	368
018	507	455	450	372	373
019	517	462	457	377	378
020	526	470	465	383	383
021	536	478	472	388	388
022	545	485	479	393	394
023	554	492	486	399	399
024	562	499	493	404	404
025	571	506	500	409	409
026	579	512	506	415	414
027	587	519	513	420	419
028	595	525	519	425	424
029	602	531	524	431	429
030	610	536	530	436	434
031	617	541	535	441	439
032	623	546	540	446	444
033	630	551	545	452	449
034	636	556	550	457	454
035	642	560	555	462	459
036	648	565	559	467	464
037	653	569	563	472	469
038	658	572	567	477	474
039	663	576	571	482	478
040	668	579	574	486	483
041	672	583	578	491	488
042	677	586	581	496	492
043	681	589	584	501	497
044	685	592	587	505	501
045	689	594	590	510	506
046	692	597	592	514	510
047	696	600	595	518	514
048	699	602	598	523	518
049	703	605	600	527	522
050	706	607	603	531	526
051	710	610	605	535	530
052	713	612	607	539	534
053	717	615	610	543	538
054	720	617	612	547	542
055	724	620	615	550	546
056	728	623	617	554	549
057	732	626	620	558	553
058	737	629	623	561	556
059	741	632	625	564	559
060	747	636	628	568	563
061	752	640	632	571	566
062	759	644	635	574	569
063	765	648	638	577	572
064	773	652	642	580	575
065	781	657	646	583	578
066	790	663	651	586	581
067	800	669	655	589	584
068	810	675	660	592	587
069	822	681	666	595	589
070	835	689	671	597	592
071	849	696	678	600	594
072	864	704	684	602	597
073	881	713	691	605	599
074		723	699	607	602
075		733	707	609	604
076		743	716	611	606
077		755	725	614	608
078		767	735	616	610
079		780	745	618	612
080		794	757	620	615
081		808	768	622	617
082		823	781	624	618
083			794	626	620
084			809	628	622
085			824	630	624
086				631	626
087				633	628
088				635	629
089				637	631
090				638	633
091				640	634
092				642	636
093				643	638
094				645	639
095				647	641
096				649	643
097				650	644
098				652	646
099				654	648
100				655	649
101				657	651
102				659	653
103				661	654
104				663	656
105				664	658

Table A-30 (Continued)

RAW SCORE	MPRS	RDBRS	RPRS	TDBRS	TPRS
106				666	659
107				668	661
108				670	663
109				672	665
110				674	667
111				677	669
112				679	671
113				681	673
114				683	675
115				686	677
116				688	679
117				691	682
118				694	684
119				696	687
120				699	689
121				702	692
122				705	695
123				708	697
124				711	700
125				715	703
126				718	706
127				722	710
128				726	713
129				729	716
130				733	720
131				738	723
132				742	727
133				746	731
134				751	735
135				755	739
136				760	744
137				765	748
138				770	753
139				775	757
140				781	762
141				787	767
142				792	772
143				798	778
144				804	783
145				811	789
146				817	794
147				824	800
148				831	807
149				838	813
150				845	819
151				852	826
152				860	833
153				868	840
154				876	847
155				884	855
156					862
157					870
158					878